Environmental Justice Issues in Communities Hosting US Nuclear Power Plants

by

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ABSTRACT

This study explores the potential risks associated with the 65 U.S.-based commercial nuclear power plants (NPPs) and the distribution of those risks among the populations of both their respective host communities and of the communities located in outlying areas. First, I examine the relevant environmental justice issues. I start by examining the racial/ethnic composition of the host community populations, as well as the disparities in socio-economic status that exist, if any, between the host communities and communities located in outlying areas. Second, I estimate the statistical associations that exist, if any, between a population's distance from a NPP and several independent variables. I conduct multivariate ordinary least square (OLS) regression analyses and spatial autocorrelation regression (SAR) analyses at the national, regional and individual-NPP levels. Third, I construct a NPP potential risk index (NPP PRI) that defines four discrete risk categories—namely, very high risk, high risk, moderate risk, and low risk. The NPP PRI allows me then to estimate the demographic characteristics of the populations exposed to each so-defined level of risk. Fourth, using the Palo Verde NPP as the subject, I simulate a scenario in which a NPP experiences a core-damage accident. I use the RASCAL 4.3 software to simulate the path of dispersion of the resultant radioactive plume, and to investigate the statistical associations that exist, if any, between the dispersed radioactive plume and the demographic characteristics of the populations located within the plume's footprint. This study utilizes distributive justice theories to understand the distribution of the potential risks associated with NPPs, many of which are unpredictable, irreversible and inescapable. I employ an approach that takes into account

multiple stakeholders in order to provide avenues for all parties to express concerns, and to ensure the relevance and actionability of any resulting policy recommendations.

DEDICATION

To my wife, Herina Miyamoto, and my sons, Marc and Will.

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Chapter 1

INTRODUCTION

To address the topic of the environmental justice implications of nuclear power plants (NPP) in the United States (U.S.), I begin with discussion of a NPP-related disaster that continues to unfold in Japan, at the Fukushima Daiichi nuclear power station. To illustrate the catastrophic potential of a NPP-related disaster, I use the Fukushima event as an exemplar of the severe and seemingly irresolvable impacts that such an event can have on the environment and the lives of people, especially those living in the surrounding communities. I argue that the accident in Japan is of major relevance to U.S.-based NPPs. With that as background, I identify possible linkages between the siting of U.S. commercial NPPs and the environmental justice issues potentially facing their host communities. The list of potential environmental justice issues provides ample justification for a detailed investigation into how such issues affect nearby communities, which I undertake in the following section. I then propose four research questions that guide my assessment of the relevant evidence pertaining to environmental justice issues in the communities that host any of the 104 reactors at 65 NPPs currently operating within the U.S. Lastly, I discuss how the remainder of this dissertation is organized.

1.1 Nuclear Power Plant Accidents and Negative Impacts

The most recent catastrophic nuclear event, which occurred at Japan's Fukushima Daiichi NPP in March 2011, served to remind us of the unpredictable and extreme risks associated with nuclear power. Other notable NPP accidents include Three Mile Island in the U.S. in 1979 and Chernobyl in Soviet Ukraine in 1986. In general, all NPPs pose a

persistent risk of a nuclear meltdown-type accident. According to Perrow (1999), NPPs are complex, tightly coupled systems. The system's complexity plays a role in the creation of unknown risks, a phenomenon Perrow accounted for in his Normal Accident Theory (NAT). His argument was centered on an assumption that each part in the system is subject to potential failure because of its design, duties, operators, and supplies, in addition to risks associated with the operating environment. When unexpected interactions of seemingly disparate failures occur within the system, they tend to stress—and ultimately break—the safeguards in ways that confound the system's operators, leading to an accident, or a more severe accident, as in the case of Fukushima. The accident might bring down a part of or the entire system. This accident is regarded as normal within the system—that is, it is a recognized potential outcome of operating, in this case, a NPP—but the operators might have taken the probability of its occurrence to be remote. In fact, the accident is and should be considered an inescapable element of the system (Perrow, 1999). Thus, in Perrow's analysis, the risks associated with NPPs are intrinsic to the system, normal, and seemingly cannot be avoided.

The inescapable risk associated with a NPP is substantially magnified when said risk is coupled with any geological or other natural hazards, such as an earthquake, tsunami, flood or other catastrophic event. On March 11, 2011, a massive earthquake registering a 9.0 Magnitude triggered a tsunami that washed up on the coast of Miyagi Prefecture, Japan, where the Fukushima NPP is sited. The earthquake caused a blackout, which brought down the cooling system for the reactors' nuclear fuel rods, resulting in the release of radioactive materials into the environment (Baba, 2013). The Fukushima NPP was not designed to withstand such a tsunami, despite having been sited near the

coast in a tectonically active zone (Acton & Hibbs, 2012). Designed to accommodate a tsunami-driven surge estimated to be at most 3.1 meters above sea level, the seawater intake was built at 4 meters above sea level. The building was built 10 meters tall, on a cliff that rises 25 meters above the shoreline. During the event, the seawater pumps were inundated when a 14-meter-high wave washed over the coastline. According to Kan (2013), the underlying motive behind the decision of Tokyo Electric Power Company, Ltd. (TEPC), to go forward using such a low projected height for a tsunami-driven surge in its design and construction of the Fukushima NPP was cost savings. In the long-run, the pay-off from the cost savings came with a price tag far beyond anything one could possibly have imagined.

The Fukushima NPP was not able to withstand the disaster's impact and, as a result, the NPP suffered critical damage to its cooling system, ultimately resulting in the melting of fuel rods in the pressure vessels in Reactors 1, 2 and 3. The immediate threat from any NPP-related disaster comes in the form of ionizing radiation emitted from the core, where the nuclear fuel rods are housed. As part of their normal, day-to-day operations, NPPs emit low levels of ionizing radiation that may pose health risks to those living in proximity and subject to prolonged exposure (Blevins & Andersen, 2011). In general, the ionizing radiation emitted from NPPs has been linked to various forms of cancer, permanent damage to human vital organs, and death (Astakhova et al., 1998; Anzai, Ban, Ozawa, & Tokonami, 2012; Canu, Ellis, & Tirmarche, 2008; Cardis et al., 2005). The Fukushima NPP began to release significant excess radiation into the atmosphere the day after the accident (Thakur, Ballard, & Nelson, 2013; Baba, 2013).

In the event of a nuclear disaster, ionizing radiation can quickly travel over great distances as the wind carries a radioactive-effluent plume over outlying areas (Cyranoski & Brumfiel, 2011). In the aftermath of the event at Fukushima, such radioactive effluents were released in two forms—gaseous and liquid. These effluents included isotopes of noble gases such as xenon (133Xe), krypton (85Kr), iodine (131I, 132I), cesium (134Cs, 136Cs, 137Cs), and tellurium (132Te). Due to the high levels of radiation released, the Fukushima accident ranked as a level-7 event according to the International Nuclear Event Scale (INES), where 1 is abnormal and 7 represents a major accident (Thakur et al., 2013). In addition, a large but unknown amount of highly contaminated water was discharged from the three reactors, from which point it was able to contaminate water in the storage volume and eventually to make its way into the ocean and groundwater (Baba, 2013). The amount of water discharged into the ocean was and remains unknown, and TEPC has since informed the public that water that had leaked from one of the more than 1,000 storage tanks at the site was found to have radiation levels sufficient to kill a person within four hours of exposure (Lazare, 2013). An estimated 80,703 gallons of contaminated groundwater continues to flow into the ocean daily (Yamaguchi, 2013).

To minimize the public's exposure to ionizing radiation the Japanese government had to implement an emergency evacuation plan soon after the accident. The government faced several challenges in doing so, however, the greatest of which was the need first to identify the impacted areas. This required that they trace the wind-driven plume as it dispersed. From the day of the accident until March 15, 2011, the wind blew out to sea. This meant that the plume's path had avoided the more populous metropolitan area of Tokyo, home to 13 million people—or 10% of the country's population (Dewit &

Hobson, 2013). A day after the accident, on March 12, 2011, the government announced that approximately 160,000 people living within a 12- to 19-mile radius of the Fukushima NPP would have to voluntarily leave the area (Morris-Suzuki, Boilley, McNeill, & Gundersen, 2012). In April, the government extended the affected area to a 31-mile radius.

The announcement of the evacuation was only the beginning of the process of implementing the disaster response plan. The people living in the communities that surround the NPP faced unimaginable destruction. According to Dr. Gregory B. Jaczko, Chairman of the U.S. Nuclear Regulatory Commission from 2009 until 2012, who met with nuclear refugees at temporary shelters set up throughout Japan, the evacuation permanently impacted the lives of people who had been living in the affected areas (Jaczko, 2013). The nuclear refugees left their homes knowing that they would never be able to return. Some older refugees wondered when or if they would again see their children and grandchildren, many of whom had left the area years earlier, moving elsewhere in search of work. Some refugees were in shock over having to leave their homes suddenly and for good—places that were and are full of memories, with walls covered in lines that tracked their children's growth. They were in a state in which they were confusing their past with their present. No society would accept such a tragedy (Jaczko, 2013). In addition, as Morris-Suzuki and colleagues (2012) have noted, there were certain failures in the government's response and in its implementation of the evacuation process. Many hospitals in the impacted areas had to be shut down because doctors and nurses had fled the high levels of radiation, and many elderly had been left in their homes or assisted-living facilities without caregivers. Efforts to maintain

confinement in and around the impacted areas did not work in conjunction with the need to evacuate because, in practice, after a period of more than 10 days, people began to face shortages of food and other supplies. When they went out to find supplies, they were exposed to high levels of radiation from the effluents that were by then beginning to contaminate the area. The monitoring of foodstuffs also revealed that many supplies had been found to be highly contaminated, rendering them useless to those in need.

All told, a vast area in the vicinity of the Fukushima NPP was contaminated with radioactive materials that will impact the surrounding environment for hundreds of years to come. First, the levels of radiation given off by nuclear fuel rods are equivalent to tens of thousands of nuclear bombs. According to Germanos (2013), two-and-a-half years after the accident at Reactor 4, there remain more than 1,300 fuel rods and other highly radioactive materials present, the fallout from which would be equivalent to 14,000 Hiroshima bombs. These materials are vulnerable to aftershocks, another earthquake, or to a building collapse. In addition, the nuclear fuel rods and spent fuel housed at the reactor sites must be kept cooled, leading to the creation of a massive volume of highly contaminated water at the site. Cooling the temperature in each of the three, 100-ton, molten-fuel cores has required daily injections of water since the day of the accident; TEPC has had to inject 215,210 gallons of water a day into the reactors: 107,605 gallons of recycled water, stored in approximately 1,000 separate 269,012-gallon-capacity, above-ground tanks; and 107,605 gallons of groundwater (Dewit & Hobson, 2013). Out of the 215,210 gallons of water injected daily, 107,605 gallons of the resulting contaminated water has been stored on-site in the above-ground tanks, requiring that a new tank be installed on site every two-and-a-half days; the remaining 107,605 gallons of

contaminated water generated per day has been pumped directly into the ocean. Approximately 350 tanks out of the 1,000 currently on site are in need of repairs because of bolts and bits of cast-off materials from the damaged reactors that have found their way into the water. Even as an ever-increasing number of tanks are required, the physical limitations at the site do not allow for the storage of the up to 40 million gallons of water needed for cooling per year—and which are thereafter contaminated. Moreover, it has been estimated that approximately 404 million gallons out of the 1,076 million gallons of rainwater to fall on and around the site over the course of a year are able to seep into the ground, from there contaminating the groundwater that flows into the sea at a rate of approximately 107,605 gallons per day (The Asahi Shimbun, 2013). Above all, the removal of 1,533 spent fuel-rod assemblies—each including approximately 400 tons of highly radioactive materials and stored in the spent-fuel pool located above Reactor 4—represents the deadliest threat to the environment and population of the area because of the extremely high levels of radiation.

The clean-up processes for similar past events have spanned decades and required immense financial resources that otherwise could have been spent on other, more productive projects with the potential to improve peoples' lives. At the time of this writing it had been more than two-and-a-half years since the accident and yet TEPC is still working to clean the site—and seems to have little chance of success. The company has been the target of mistrust and criticism on the part of the public for its incompetency in this regard—the volume of contaminated water leaking from the plant is 6,700 times the legal limit, and neither the government nor TEPC has yet been able to contain the problem (Lazare, 2013). Nearly 83,000 refugees evacuated from some of the most

heavily contaminated areas have given up all hope of ever returning to their homes (Fackler, 2013). The refugees claim there is no way they will ever be able to return. The government has since realized that the unprecedented scope of the cleanup might see the clean-up effort take years, if not decades, longer than initially projected.

As the Japanese government and TEPC have come to realize their collective inability to effectively manage the clean-up process, Prime Minster Shinzo Abe has sought out foreign assistance, including knowledge and expertise (The Japan Times, 2013). To aid in containing the radiation, the government invested $500 million in building a giant wall of ice to surround the plant, although experts were quick to voice their doubts that such an approach would prove effective (Lazare, 2013). In addition, the government earmarked in its borrowing plan $80 billion for expenses related to events at Fukushima that nevertheless excluded any of the costs associated with the decommissioning of the NPP's six reactors (Takamoto, 2013). In effect, this has rendered the Fukushima accident a global disaster. Every day, unknown amounts of highly contaminated water are allowed to flow into the Pacific Ocean. The International Olympic Committee gave a green light to go ahead with construction for the 2020 Olympic Games, recently awarded to Tokyo, in part because Prime Minister Abe claimed that the situation at Fukushima was becoming manageable. Yet, a few weeks after having made the claim, he asked for international assistance with the clean-up.

Evidence that the accident has taken on a global dimension can be seen, indirectly, in the fish stocks pulled from the oceans surrounding Japan, which have all been found to be contaminated with radiation. According to projections put out by *straight.com*, a Vancouver-area newspaper and associated website, some 80,000 people

worldwide who eat fish harvested from the Pacific Ocean will die of cancer (Roslin, 2013). The estimate was made using the cancer-risk formula developed by the U.S. Environmental Protection Agency (EPA), using a sample of the radiation levels detected in 33,000 fish harvested from the Pacific. China has asked that Japan take effective steps in order to end the negative impacts of the ongoing disaster (Dewit & Hobson, 2013). Consumers in South Korea and other countries in the region have expressed concerns about food safety, while some businesses have halted operations in and around the affected areas due to concerns over radiation exposure—South Korea's Asiana Airlines, for instance, discontinued its charter service to Fukushima Airport (Dewit & Hobson, 2013).

All of this is to say that the effects of the accident at the Fukushima NPP have not been isolated to Japan. Also relevant, however, are the potential risks the accident has highlighted with regards to U.S.-based commercial NPPs—namely, the supplier of the reactors in use at the Fukushima NPP is a U.S.-based company that has also supplied 23 of the same type of reactors to NPPs in the U.S. Thirty-seven years ago, three scientists—Dale G. Bridenbaugh, Gregory C. Minor, and Richard B. Hubbard—resigned from General Electric (GE) in a protest intended to bring an immediate stop to the operating of the company's Mark 1 nuclear reactor (Mosk, 2011). They believed that the reactor's design included a serious flaw that could result in, or contribute to, a devastating accident—in short, the reactor as designed would not be able to handle the immense pressure generated in the event that it lost cooling power; five out of the six reactors to have exploded at the Fukushima NPP were GE Mark 1 reactors.

Furthermore, there is evidence that U.S.-based NPPs have not been built to withstand the forces associated with a severe earthquake. On August 23, 2011, a 5.8 Magnitude earthquake hit Louisa County, Virginia, its epicenter only five miles from two nuclear power reactors at the North Anna Power Station (Sciutto, Cloherty, & Ferran, 2011). The earthquake was sufficient to leave the NPP at "Alert", the second-lowest of the U.S. Nuclear Regulatory Commission's (NRC) four emergency classifications (Koch, 2013). The same earthquake also moved twelve other NPPs—namely, Peach Bottom, Three Mile Island, Susquehanna and Limerick, in Pennsylvania; Salem, Hope Creek and Oyster Creek, in New Jersey; D.C. Cook and Palisades, in Michigan; Calvert Cliffs, in Maryland; Surry, in Virginia; and, Shearon Harris, in North Carolina—to "Unusual Event" status, the NRC's lowest such classification. Between 2010 and 2012, there were a total of 56 reactors that experienced "Near-Miss" events—events that could have led to damage being done to the reactor core (Lochbaum, 2012). Sixteen of the 56 were exposed to more than one such event.

In short, U.S. commercial NPPs are vulnerable to natural hazard events. When impacted by such a hazard, it is likely that many would prove unable to withstand the event (Cappiello & Donn, 2011). Given the number of "near-miss" events recorded over the past three years, there would seem to be ample potential for an accident to occur that, with better preparation and strengthened safeguards in place, could have been avoided. The severity of any such accident and its negative impacts on the lives of the people living in the nearby communities would be difficult to overestimate. Evaluation tasks are immense and complex, and cleaning up radioactive contamination requires international

experts, immense financial resources, and decades, if not centuries, as the Japanese case is illustrating all too clearly.

1.2 Nuclear Power Plant Siting and Environmental Justice

As mentioned above, the communities that host NPPs inevitably bear the burden of the persistent risks associated with them. In instances in which the host communities were not allowed to participate in the decision-making process that resulted in the NPP being sited in their area, the communities have had to involuntarily bear the risk of negative environmental impacts deriving from the plant, thus raising a number of environmental justice issues.

In the early years of civilian nuclear power, between 1957 and 1975, the Atomic Energy Commission (AEC) oversaw the NPP siting process. The AEC was founded under the Atoms for Peace program, which was later transformed into the Price-Anderson Act of 1957 (Hochfelder, 1999). Under the AEC's guidelines, appropriate site selection was based on Part 100 of Title 10 of the Code of Federal Regulations (CFR), which included three key criteria—exclusion area, low-population zone and population center distance (Greenberg & Krueckeberg, 1974). The exclusion area surrounded the proposed site in a circular zone of a size defined by the licensee, which was in turn surrounded by a low-population zone. Residential land use was not permitted in the exclusion area, and the adjacent low-population zone was to have a population of a size that could easily be evacuated in the event of a serious accident. "The population center distance must be at least one and one-third times the distance from the reactor to the outer boundary of the low population zone" (Greenberg & Krueckeberg, 1974). The authors noted several

difficulties they encountered in attempting to apply the AEC's guidelines, which included a lack of clear definitions, such as of the exclusion area radius, a lack of a quantified limit on the population size for the low-population zone, and a lack of a quantified population size to be used to define the nearest densely populated area. The AEC's decision making in the siting process saw it exposed to criticism for its having to play dual roles, as both promoter and regulator of nuclear energy (Golay, I.I.Saragossi , Wilefert, & .M., 1977), and for the vagueness of these three key terms (Greenberg & Krueckeberg, 1974). Of course, the idea of environmental justice did not exist during the era of AEC administration, so one cannot expect their guidelines to have considered issues of social equity. During its administration, the AEC issued operating licenses for 126 reactors, of which 103 remain in operation as of this writing, 22 have been shut down and one was temporarily closed (US NRC, 2004).

In 1970, the National Environmental Policy Act (NEPA) went into effect and the EPA was established, with its mission to incorporate environmental protection policy into all federally sponsored projects. In 1975, after taking into consideration criticisms of the AEC, the NRC was founded by the Energy Reorganization Act of 1974 (US NRC, 2011b). The NRC was given sole responsibility for the licensing of all nuclear power reactors in the country through a two-step licensing process, which included both a construction and an operating license application (US NRC, 2004). By law, public participation in the licensing process was encouraged through adjudicatory (or courtroom-style) hearings that disclosed the proposed plant's conformity with existing environmental law and any quality of design and construction issues (Mariottee, 2006). After 1992, the licensing process was reorganized into a single step. The new, simplified,

one-step process has been the subject of some criticism, however, as it placed greater constraints on public participation and bestowed more advantages upon nuclear operators. Public participation was seen to be discouraged by the requirement of legitimate contentions for each public hearing by the Atomic Safety and Licensing Board (ASLB), a three-judge panel of NRC employees made up of two technical experts and one attorney. The timeframe during which the public was able to file such contentions was limited to a 60-day window, and the high costs of attorney's fees and the fees needing to be paid to expert witnesses—costs estimated to be between $100,000 and $500,000 for a given case—also acted to limit the public's ability to intervene in the licensing process (Mariottee, 2006). These procedural limitations might have contributed to decisions made around environmental justice issues that have since negatively impacted the health and well-being of people living near the power plants.

Environmental equity studies emerged out of the then-nascent environmental justice movement in the U.S. South in the early 1980s. The emergence of anti-NPP movements, however, preceded the environmental justice movement by more than 20 years, linked to pre-existing anti-nuclear-weapons movements of the 1950s (Gottlieb, 2005). Beginning in the 1960s, broad anti-nuclear technology movements began to contest the siting of NPPs at various locations in the U.S. over concerns of ionizing radiation and the plants' potential for nuclear accidents (Gottlieb, 2005). Contested sites included: Calvert Cliffs Nuclear Power Plant, Maryland; Seabrook Station Nuclear Power Plant, New Hampshire; Diablo Canyon Power Plant, California; Shoreham Nuclear Power Plant, North Carolina; and, Three Mile Island Nuclear Generating Station, Pennsylvania (Giugni, 2004). Some site proposals were abandoned due to strong

opposition—including, for example, a proposed NPP at Bodega Bay, north of San Francisco, in 1958 (Garb, 1999). With the cessation of construction of new NPPs in the U.S. as of the 1980s, the anti-NPP movement substantially slowed but nuclear power remained a potent local concern, especially in those communities that already hosted nuclear facilities (Gottlieb, 2005).

While justice and equity were not part of the discourses of the previous anti-nuclear power campaigns, they do figure prominently in environmental justice studies. According to Bullard's definition (1996), environmental justice refers to the equal protection from environmental harms of all peoples, regardless of race, sex, income, and age. This definition emphasizes equity as essential to environmental justice. According to Margai (2010a), environmental equity has a broader context and engages with the geographical and spatial distribution of environmental risks. For Bullard and colleagues, environmental equity can be distilled into three categories—namely, procedural, geographic and social equity (Bullard, Mohai, Saha, & Wright, 2007a). Procedural equity concerns fairness in environmental decision-making processes, which is often examined by looking into how and whether rules, regulations, and systematic evaluation criteria are applied in a uniform and nondiscriminatory way. Geographic equity investigates whether environmental risks are equally distributed according to the spatial location of communities and their proximity to potentially hazardous and/or toxic facilities. Social equity evaluates how sociological factors—such as race, ethnicity, class, culture, lifestyle, and political power—influence environmental decision making. With its focus on proximity-based assessment, the present study focuses on two types of equity—

namely, geographic and social—in attempting to answer the research questions presented below.

There has been much recent concern over involuntary exposure to industrial emissions, particularly within the environmental justice movement, yet there has been virtually no discussion of the environmental equity implications of NPP-related hazards. This dissertation will address that gap in the literature. In the chapters that follow, I define environmental equity as the equal spatial distribution of environmental risks across populations or groups (Margai, 2010b), a definition that is based on the environmental justice principle that, "all people and communities are entitled to equal protection of environmental and public health laws and regulations" (Bullard, 1996). With a primary goal of addressing environmental justice issues, President Clinton in 1994 signed Executive Order 12898, which required each federal agency to have a plan "that identifies and addresses disproportionately high and adverse human health or environmental effects of its programs, policies, and activities", and to "make environmental justice a part of all they do" (Bowen, Salling, Haynes, & Cyran, 1995). The 65 NPPs currently operating in the U.S., however, all were built between 1964 and 1978 (US NRC, 2011b), well before President Clinton's Executive Order was put into effect. That Executive Order now provides grounds for environmental justice assessments based on the current guidelines in place for the NPP siting process as defined by the NRC. The siting decisions of the U.S.-based NPPs currently in operation therefore were made in a period during which the inequitable impacts of industrial hazards simply were not considered in the procedures for the selecting of appropriate sites. Given the by now well-documented evidence that, in many cities, hazardous industries are

disproportionately located in areas with predominantly poor and minority populations, the question that naturally follows is: Do NPPs exhibit similar patterns of inequitable proximity to low-income and racial minority populations?

The primary goal of this dissertation is to investigate the potential environmental risks borne by the communities living in proximity to the 104 nuclear reactors at 65 NPPs currently operating in the U.S. In particular, I will examine whether minorities and the poor are overrepresented in host communities. Consistent with the emergency evacuation guidelines set forth by the NRC (US NRC, 2011a), I will consider two exposure zones that mirror the two emergency planning zones (EPZs) the NRC calls for to surround any NPP: the plume-exposure pathway EPZ, which is the area within a 10-mile radius of a NPP; and, the ingestion pathway EPZ, which is the area within a 50-mile radius. There is no publicly avaiable historical data on different radiation dosage levels as sorted by distance from NPPs that could be used in order to estimate the extent of risk by distance. Therefore, the present study uses a proximity-based assessment of NPPs and measures equity in terms of the distribution of outcomes. Proximity-based assessment focuses on exposure to risk arising from the presence of a hazardous or toxic facility and makes no attempt to anlayze the extent of the risk (Cutter, Holm, & Clark, 1996; Bolin et al., 2002)—that is, the assumption is made that, all else being equal, living closer to a NPP is riskier than residing in a more distant location. Next, this study constructs a potential risk index to measure the level of risk associcated with a given indiviudal NPP. The risk index was constructed with consideration given to operation risk, disaster risk, and location risk and was populated with data pertaining to individual U.S.-based NPPs. Finally, a simulation exercise of a nuclear disaster is carried out for one NPP, Palo Verde, using the

Source Term and Release Pathway model of the RASCAL software program, version 4.3. The estimated levels of radition dosage by distance in this simulated accident are calculated to provide a projection of the distribution of risk across the effected demographic groups should a nuclear disaster occur at this site.

1.3 Research Questions

In order to conduct a systematic assessment of the environmental justice issues associated with NPPs in the U.S., I will seek answers to the following questions:

1. Are the disparities in the socio-demographic characteristics of the populations of communities within a 50-mile radius of a NPP greater than the same disparities of populations living in communities that are outside of a 50-mile radius from a NPP? Relatedly, did those disparities increase during the periods 1990–2000 and 2000–2010?
2. Among communities within a 50-mile radius of an NPP, is there any statistical association between the communities' distance from a NPP and their socio-demographic characteristics?
3. What are the levels of potential risk associated with NPPs and with the socio-demographic characteristics of specific populations living within a 50-mile radius of a NPP?
4. Is there any association between exposure to radioactive effluents and the socio-demographic characteristics of populations based on a simulated core-damage accident at a single NPP?

Research Question 1 is an attempt to identify the socio-demographic characteristics—including the predominant racial or ethnic components of the host communities and the socio-economic status of a given such community as a whole—of populations living within a 50-mile radius of one of the 65 NPPs currently operating within the U.S. (i.e., the host communities) and to compare these to the socio-demographic characteristics of populations living in communities outside of that radius but within the same state in which that NPP is located. A statistical test is conducted to examine if the difference in value for any one socio-demographic characteristic between the two areas is significantly different from zero. In addition, a second statistical test is used to see if such disparities registered an increase or decrease in severity during the periods 1990–2000 and 2000–2010.

Research Question 2 considers any association that may exist between a host community's distance from a NPP on the one hand and, on the other hand, the socio-demographic characteristics of host community populations living at different distances from said NPP.

Research Question 3 seeks to quantify the potential risks of individual NPPs and considers whether any particular ethnic or racial group is exposed to a higher level of risk based on a risk index calculated using several criteria. The potential risks include three types—namely, NPP-related risks, environmental hazard risks, and location risks. The NPP-related risks stem from radioactive effluents emitted by the NPP, the risks deriving from the NPP's normal, day-to-day operation, and the age of the plant. The hazard risks include hurricanes, tornadoes and seismic events. Location risks include the plant's physical location and distance from the nearest city. When a NPP is located nearer to a

densely populated zone such as a major metropolitan area, then the NPP should be understood as posing a greater potential hazard.

Research Question 4 attempts to identify those racial and/or ethnic groups that would be exposed to significant amounts of radioactive effluents in the event of a nuclear meltdown-type accident through the use of a simulation performed for a single NPP near a major urban center—in this case, Phoenix. Using the Source Term and Release Pathway model of the RASCAL 4.3 program code, I estimate the radiation doses that would be delivered within the plume footprint in order to identify any statistical associations that may exist between the socio-demographic characteristics of the people who would be exposed to the plume path and the estimated radiation dosages said populations would be exposed to at varying distances from the accident site.

1.4 Organization of the Study

The remainder of this dissertation is organized as follows. Chapter 1 introduced the concept of a nuclear meltdown-type accident at a NPP and discussed its negative impacts, described in general terms the decision-making process of siting NPPs within the U.S., identified the potential environmental justice issues that might impact the host communities of said NPPs, and laid out the present study's research questions. Chapter 2 reviews the pertinent literature on environmental justice. Chapter 3 describes the present study's research methodology. Chapter 4 discusses the findings pertaining to Research Question 1; Chapter 5 presents the findings to Research Question 2; Chapter 6 details the findings relevant to Research Question 3; and, Chapter 7 describes the findings that bear on Research Question 4. Chapter 8 provides some concluding thoughts and remarks.

Chapter 2

LITERATURE REVIEW

This chapter presents a review of the literature on NPP-related environmental justice issues. Environmental justice is defined in practice as:

> [T]he fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work. (US EPA, 2013)

Referring to the U.S. EPA's definition, I argue that in order to determine whether a particular group within a community could be said to be faced with an environmental justice issue we must first consider three salient elements: (1) What are the sources of potential environmental or health hazards? (2) Who are the people living near the source(s) of those hazards? And, (3) what are the criteria to be used to determine what constitutes environmental justice? These criteria can include: (1) equal, or an equivalent degree of, protection from hazards; (2) meaningful involvement in relevant decision-making processes; and, (3) access to a healthy environment in which to live, learn and

work. To provide a thorough review of the literature relevant to this subject, I similarly focused on three salient elements: (1) What are the hazards associated with NPPs? (2) Who comprises the communities that surround NPPs? And, (3) what theories are available that establish a foundation for the establishing of environmental justice criteria?

In this chapter, first I discuss the hazards associated with NPPs. Second, I seek out studies on peoples and communities that live in proximity to NPPs. Third, I discuss theories and analytical frameworks that can act as a foundation upon which we can evaluate environmental justice issues. Fourth, I describe select theories and the research methods applied in this study.

2.1 The Risks of NPPs

The emergence of commercial nuclear power can be traced back to December 8, 1953, the day President Dwight Eisenhower gave his "Atoms for Peace" speech, in which he highlighted his plan to transform nuclear fission materials—then, as now, the subject of much public fear—into a resource with a peaceful end use (Eisenhower, 1953). On December 18, 1957, Shippingport Atomic Power Station—the world's first commercial nuclear power plant, built on the Ohio River twenty-five miles northeast of Pittsburgh—began generating nuclear power (US NRC, 2011b). Since then, the United States has brought online a fleet of commercial nuclear reactors, located at 65 sites scattered across 31 states.

Despite their years of operation, NPPs have yet to prove themselves the peaceful resource for the benefit of humankind that President Eisenhower first envisioned. In fact, NPPs use a technology that seeks to harness nuclear fissionable materials to produce heat, which is used to boil water, transforming it into steam that is then used to power electric

generators. These nuclear fissionable materials were initially used in the manufacture of nuclear weapons. Their powerful destructive potential is beyond imagination, as was revealed by the Trinity test—the first detonation of an atomic bomb, which occurred at 5:29:45 a.m., July 16, 1945, in the deserts of New Mexico (Masco, 2006). The destructive potential of nuclear fission can escalate beyond a NPP's ability to control it, for instance when a plant experiences an accident that damages its nuclear reactor, where the fuel rods made of fissionable materials are housed.

In the 56 years since the reactors at Shippingport came online, NPPs have on occasion demonstrated a destructive potential that goes beyond the human capacity to manage it. The first publically acknowledged NPP-related accident took place at Three Mile Island (TMI), 26 years after Shippingport, when the plant encountered a major core-damage accident. Fortunately, the event came to an end without requiring an evacuation on March 28, 1979 (US NRC, 2013b). It has been estimated that more than 2 million people were exposed to radiation (US NRC, 2013b), but the exact level of the doses they were exposed to was not then able to be determined with any precision. Residents living within a 5-mile radius of the plant, including preschool-aged children and pregnant women, were evacuated but only after two days had passed since the accident occurred (Three Mile Island Alert, 2013).

The second demonstration of NPPs' powerful destructive potential occurred at Chernobyl NPP in Ukraine, seven years after the event at TMI. The Chernobyl plant experienced an accident that breached its reactor containment vessel and released radioactive effluents into the environment on April 26, 1986 (US NRC, 2013a). Areas

within an 18-mile radius of the plant were abandoned and approximately 115,000 people were evacuated; an additional 220,000 people were evacuated in subsequent years.

Twenty-five years after the Chernobyl accident, the third and most recent NPP-related accident occurred when an underwater earthquake triggered a tsunami that hit the Japanese coastline, causing massive damage at the Fukushima Daiichi NPP (US NRC, 2013f). This catastrophe, as described in Chapter 1, has been regarded as a nuclear disaster of a degree that humankind has never before seen in the modern era (Cosmic Convergence, 2013). The accident has proven to be far worse in its effects than the previous two nuclear power-related accidents. The Japanese government in its initial response evacuated approximately 160,000 people living within a 12- to 19-mile radius of the Fukushima plant (Morris-Suzuki et al., 2012), but the impacted areas have proven to be much wider than the evacuated areas.

These accidents at NPPs are normally preceded by an event or a series of events that trigger or contribute to the damage done to the reactor core. When brought under control, events with the potential to have escalated into major accidents—that is, those of the type capable of causing reactor-core damage—are described as near-miss events. The NRC issues an annual report detailing all near-miss events and classifying them according to three categories defined by the type of team sent out to inspect the event, which is in turn determined by the level or degree of severity of the event. There are three such teams—namely, the augmented inspection team (AIT), the incident inspection team (IIT) and the special inspection team (SIT). The AIT evaluates events that pose a 10-fold increase in risk, whereas the SIT investigates events that pose a 1,000-fold increase in risk level (Lochbaum, 2012; Lochbaum, 2011; Lochbaum, 2010). In 2010, there were a

total of 14 near-miss events (13 SIT and 1 AIT); in 2011, 15 (14 SIT and 1 AIT); and, in 2012, 14 (11 SIT and 3 AIT), figures that hint at the regularity with which such plants pose a risk to their surrounding areas.

Another risk associated with NPPs is that of contamination of the sort caused by the unmonitored and unplanned release of liquids. Commercial NPPs release radioactive materials into the environment, in either or both liquid or gaseous form, on a routine basis. There have been incidents of unplanned and unmonitored leaks of liquids that occurred at Braidwood, Indian Point, Byron and Dresden NPPs. The Liquid Radioactive Release Lessons Learned Task Force (LLTF) has been tasked with identifying the causes of such leaks (Richards et al., 2011). Their findings included the following: (1), the construction of plant components did not meet existing safety standards; (2), the components that caused or contributed to said leaks were not required to be monitored, nor were they subject to routine maintenance activities according to NRC regulations; (3), some components associated with subterranean leaks or with spent-fuel pools were not readily accessible or physically visible; (4), liquid leaks can enter undetected into groundwater; (5), the contamination of groundwater may go undetected because it is not required to be monitored according to existing NRC regulations; and (6), the contaminated groundwater could flow offsite undetected. The communities that host NPPs therefore are at perpetual risk due to the very presence of the NPPs.

Another potential risk associated with NPPs surrounds their spent fuel—the highly radioactive used fuel rods that are removed from a nuclear reactor. Nuclear fuel rods are made of fissionable materials and retain their inherent destructive potential long after their initial use. Approximately 74% of all spent fuel is stored at the reactor site,

most often in spent-fuel pools, while the rest are stored in dry-storage casks distributed across 33 states (US GAO, 2012). The U.S. Government Accountability Office (GAO) projects an annual 2,000-metric-ton increase in the amount of spent fuel stored on site, with the current 70,000-metric-ton spent-fuel stockpile growing to 140,000 metric tons within a decade. New storage facilities are expected to be ready to begin accepting spent fuel in 15 to 40 years. The potential risks associated with such facilities include: (1) the release of radiation, which could have severe negative impacts on human health; and, (2) a self-sustaining fire if and when the water is drained and the fuel rods are exposed to the air. The amount of hazardous materials stored in each state varies, from a maximum of approximately 2,000 metric tons in Illinois to a minimum of less than 100 metric tons at the decommissioned St. Vrain NPP, in Colorado (US NRC, 2012b). Above all, the threats that are inherent to the 70,000-metric-ton spent-fuel stockpile cannot and must not be underestimated. To put in perspective the dire consequences of doing so, bear in mind that only approximately 400 metric tons of spent fuel were stored in the fuel pool at the Fukushima NPP, materials that are equivalent in their destructive potential to 14,000 Hiroshima bombs (The Asahi Shimbun, 2013).

This spent fuel, among the most hazardous material created by humans, is also always vulnerable to terrorist attack (Holt & Andrews, 2007). The terrorist attack on the World Trade Center in New York and the Pentagon building in Washington, DC, on September 11, 2011—the so-called 9/11 attack—serves as reminder of the dire consequences and very real threat of a potential attack on a NPP. Afterwards, evidence came to light that revealed Al Qaeda had considered targeting a NPP in their initial plan of attack (Holt & Andrews, 2007).

According to the National Academy of Sciences (NAS), a successful attack on a spent-fuel storage facility would be difficult but is possible. In the event of such an attack, the spent fuel could become the source of a self-sustaining zirconium cladding fire, and would in such an event release a massive amount of radioactive materials. Communities that host NPPs therefore live with the unpredictable risk of exposure to a massive release of radiation.

The most hazardous human-made materials do not sit forever in the spent-fuel pools or stay safely in the dry-storage casks housed at the reactor sites. When they are transported, they pose great risk not only to the host communities but also to the communities at large along the transit route. The purpose of transporting spent fuels is to relocate them to storage space shared by multiple reactor sites operated by the same owner (US NRC, 2013c). According to Garrick (2003), between 1964 and 1997, a total of 3,025 shipments moved 829 metric tons of heavy metal (MTHM) by road and an additional 1,445 MTHM by rail. The transportation of such materials is closely supervised by the NRC and the U.S. Department of Transportation (US NRC, 2013c). Although regulated and supervised, the transportation—whether by road or by rail—has not been accident free. Between 1971 and 1995, there were four accidents on the highways and four on the rail lines; one highway accident resulted in the death of a driver and detectable emissions of radiation (Garrick, 2003; US NRC, 2013h). All of the approximately 70,000 metric tons of spent fuel stored at reactor sites are in-waiting to be transported to high-level repositories, when such facilities are open and available to accept said materials (US NRC, 2013c). With the Obama administration's 2009 decision

to withdraw funding for the Yucca Mountain High-Level Nuclear Waste project, there is at present no permanent storage facility under development (Wald, 2009).

Another risk that NPPs pose is inherent to their design and serves to highlight why it is critical that the design of a reactor that contains fissionable fuel rods during its normal operation be centered on safety. The Mark 1 containment vessel, first produced by GE in the 1960s and still in use at Fukushima NPP at the time of the accident there, contributed to the catastrophic events of 2011 (Zeller, 2011). As early as 1975, it was known that there had not been sufficient testing of the containment design and that any flaws that might persist could compromise the safety of the plant and its surroundings. However, the warning did not lead to a halt in the operating of the design because it had by that time been widely accepted throughout the nuclear power industry. However, Harold Denton, a retired NRC official, pointed out that the probability of a Mark 1-type reactor bursting if the fuel rods were to enter into meltdown was approximately 90 percent (Denton 1987). In the United States, there remain 23 Mark 1 reactors still in operation, located at 16 NPPs, including: Oyster Creek, New Jersey; Dresden, Illinois; and Monticello, Minnesota. The host communities of NPPs that still operate Mark 1 reactors are at greater risk of exposure to a Fukushima-like disaster than sites with safer reactor designs. Nuclear power plants are also vulnerable to seismic events of the type that played a role in triggering the catastrophe at Fukushima. The NPPs sited along the U.S. eastern seaboard in particular do not include in their designs any kind of measures meant to shield against the aftereffects of a strong earthquake (Koch, 2011).

Nuclear power plants, even under normal operating conditions, release limited amounts of radioactive contaminants into the atmosphere. In the event of a nuclear

disaster, the quantities of radioactive materials of course can increase by orders of magnitude. Ionizing radiation can quickly travel more than one hundred kilometers (62 miles), carried on the wind in the form of a radioactive plume to outlying areas (Cyranoski & Brumfiel, 2011). In general, the routine emissions of ionizing radiation originating from NPPs are known to be associated with elevated incident rates of a number of types of cancer, permanent damage to human vital organs, and death (Astakhova et al., 1998; Canu et al., 2008; Cardis et al., 2005). Populations living near to a NPP, as well as those that may prove to be in the path of a radioactive-effluents plume in the case of an accident, therefore are vulnerable to exposure to high levels of radiation.

The communities that host such facilities shoulder the potential risks associated with nuclear power from the time the plant begins operation until the time it is decommissioned—for a typical reactor design, the use life is between 40 and 60 years (Green Peace, 2010). After a plant is shutdown, it takes under normal conditions 50 years for the reactor to cool; this is followed by a period of decommissioning that normally takes another 40 to 60 years (Green Peace, 2010). The NRC has advanced three strategies for dealing with end of use at a NPP: (1) DECON, or decommissioning strategies; (2) SAFSTOR, or deferred dismantling; and, (3) ENTOMB, or the permanent encasing on site of radioactive contaminants (US NRC, 2013d). For example, Hallam Nuclear Power Plant, Nebraska, a NPP with a short use life, was decommissioned in 1971. All potential containments were at that time buried underground. Since then, the Department of Energy, working in conjunction with the Nebraska Department of Health, has monitored the entombment site for possible groundwater contamination and radiation, and will

continue to do so for a period of 119 years, until 2090 (Nebraska Energy Quarterly, 1997).

Above all, the potential risks associated with NPPs can be explained by Perrow's 'normal accidents theory'. As noted previously, NPPs are complex and tightly coupled systems and complexity produces unknown risks; according to Perrow's theory:

> Nothing is perfect, neither designs, equipment, procedures, operators, supplies, or the environment. Because we know this, we load our complex systems with safety devices in the form of buffers, redundancies, circuit breakers, alarms, bells, and whistles. Small failures go on continuously in the system since nothing is perfect, but the safety devices and the cunning of designers, and the wit and experience of the operating personnel, cope with them. Occasionally, however, two or more failures, none of them devastating in themselves in isolation, come together in unexpected ways and defeat the safety devices—the definition of a "normal accident" or system accident. If the system is also tightly coupled, these failures can cascade faster than any safety device or operator can cope with them… [I]f the accident brings down a significant part of the system, and the system has catastrophic potential, we will have a catastrophe. (Perrow, 1999, pp. 356–357)

According to Perrow's analysis, the risks associated with NPPs therefore should be seen as intrinsic to the system, normal, and as something that cannot be avoided.

2.2 NPP Host Communities

Given the unpredictable nature and destructive potential of the fissionable materials that make up their fuel rods, and the unthinkable long-term effects the release of such materials into the atmosphere could have on humankind, it is not surprising that NPPs in the U.S. are subject to regulation by U.S. government authorities. Every stage of their life cycle, including the selecting of a plant site, the granting of a construction license and the warranting of an operating license, must first be approved by the relevant regulatory authorities. When a NPP is introduced into an existing set of communities, all such communities become hosts. The host communities must then shoulder the burdens of the potential risks described above.

As discussed earlier (Chapter 1), the AEC, in an era that preceded the concepts of environmental justice and equity, made siting decisions involving 126 NPP operating licenses (US NRC, 2004). In 1975, after taking into consideration criticisms of the AEC, the NRC was founded by the Energy Reorganization Act of 1974 (US NRC, 2011b). The NRC was given sole responsibility for the licensing of all atomic power reactors in the country through a two-step licensing process, which gave them oversight of both construction and operating license applications (US NRC, 2004). By law, public participation in the licensing process was encouraged through adjudicatory, or courtroom-style, hearings where the proposed NPPs conformities and nonconformities with existing environmental law were presented. At these same public meetings, comments could be presented on the proposed NPP's quality of design and on any apparent construction flaws (Mariottee, 2006).

After 1992, however, the licensing process was transformed into a one-step process that allowed for the granting of a combined construction and operating license in a single step. The one-step process has been criticized for placing increased and undue constraints on public participation, and for providing greater advantage to nuclear utilities. Public participation has been discouraged as a result of the requirements for legitimate contentions at each public hearing held by the ASLB. Chief among the barriers has been the fact that the legitimacy of public contentions are decided upon by a three-person panel of NRC employees—two technical experts and one attorney. The public is only given 60 days to voice their contentions, and filing an objection involves substantial costs, including attorney's fees and fees charged by the paid experts required to testify in support of the objecting party (estimated to cost between $100,000 and $500,000) (Mariottee, 2006). These substantial barriers to public participation have clear procedural equity implications and could easily lead to environmental decision-making processes and outcomes that could negatively affect the people living near NPPs.

Many communities are at first resistant to the notion of having a NPP sited nearby. In the early days of the nuclear power industry there existed a tension between scientists—many of whom perceived only the advantages that would come with the widespread utilization of nuclear power—and people who saw first and foremost the risks associated with nuclear fuel, spent fuel rods and their associated radiation. In the 1970s, anti-nuclear power protests received national public attention and succeeded in halting or delaying the building of a number of NPPs (Nuclear Heritage, 2013). Some protests attracted large crowds—more than 70,000 people, for example, marched in protest against plans to bring nuclear power to Washington, DC, in May of 1979. In certain

instances, protesters were faced with arrest for their actions—some 1,414 protesters against the construction of Seabrook NPP in New Hampshire, for example, were arrested on May 2, 1977 (Nuclear Heritage, 2013).

Living near a NPP means living with the constant risk of exposure to low-level radiation and the risk of an acute release and, as such, each plant carries with it inherent potential environmental and health risks. Radiation is emitted as a result of a NPP's normal operations, temporary shutdowns and abnormal situations, such as a fuel-rod meltdown (Ottaviani & Wehe, 1989). Continued exposure to such low-level radiation, however, may have serious health effects, including permanent cellular damage and chronic illnesses such as leukemia and thyroid and other cancers (Ramana, 2009), and even premature death (Denton, 1987). Studies that have sought to establish whether exposure to radiation is related to the incidence of certain kinds of cancer have faced a range of challenges (Bouges, Daures, & Hebrard, 1999; Canu et al., 2008; Cardis et al., 1995; Cardis et al., 2005; Sexton & Adgate, 1999), including a lack of longitudinal data on the effects of prolonged exposure to low-level radiation, a lack of data on the effects of varying radiation doses, a lack of data on when people first moved to host communities and their state of health upon doing so, and so on. As of 2012, the NRC was still working to prepare a study design that would allow for the accurate assessing of cancer incident rates among populations living near NPPs (2012). There has been at least one prior study that sought to compare cancer incident rates during the years in which a NPP was in operation to the years after the NPP had been decommissioned (Mangano & Sherman, 2013; US NRC, 2013d). Mangano and Sherman conducted a study comparing cancer incident rates among the population of the host communities of Rancho Seco NPP,

in Sacramento County, California, in which they compared data collected during the last two years of the plant's operation (1988–1989) with data collected two decades after its decommissioning. Their findings revealed that cancer incident rates declined across 18 of 31 categories. People in communities that experienced prolonged exposure to low-level radiation therefore were more likely to have developed or otherwise have been diagnosed a chronic illness such as cancer (Mangano & Sherman, 2013). The challenges researchers face in attempting to establish a relationship between a community's prolonged exposure to low-level radiation and an increased cancer incident rate amongst members of that community, however, do nothing to undermine the cancer risks associated with more extreme dosage levels of radiation, such as those associated with exposure to plutonium. The scientific study of the effects of exposure to radiation began with the injection of plutonium into 18 men, women and children—performed in a US hospital ward in 1945 and without informing the unwitting subjects of the potential risks and dangers—and has continued with present-day studies that have attempted to better understand the human body's reaction to various radioisotopes (Welsome, 1999).

Above all, the inability to participate in the siting decision, the stress of living with the unpredictable and unthinkable risks associated with NPPs, and the constant and ongoing exposure to low-level radiation—and the negative health impacts of such exposure—has meant that the people living in NPP host communities have had to bear an unequal share of the risk, and therefore are seen to be faced with environmental injustice.

2.3 Theories on Environmental Justice

Accepting the notion that NPP host communities face environmental injustice issues due to the unequal burden of risk they assume, I next searched for theories that explained the notion of justice in general, and environmental justice, in particular. My findings are presented in this section.

There are a number of conceptions of justice that can be traced in the contemporary literature that bears on environmental justice. Schlosberg (2007) asserted that justice requires not only distribution but also other components if there is to be a comprehensive understanding of the concept. He stated that justice could be better understood as comprising a number of inter-connected components—namely, recognition, participation and capability.

According to Rawls (1999), justice is a standard unit of measurement of how goods and ills are distributed among a society's members. Speaking from a liberal perspective on justice, Rawls argued that every individual in a society has rights, including the less well-off, and therefore all should expect to receive a fair distribution of good and bad. Another concept that is connected to the notion of distributional justice is recognition. Schlosberg (2007) argued that a lack of recognition of certain groups in political and social realms could lead to an unjust distribution of goods and ills. Capabilities are defined as a person's opportunities to do and transform the distributed goods to benefit one's own life and well-being. The connections between equity, recognition, participation and capabilities in environmental justice movements are: recognition is necessary for the individual to participate; when the individual participates, it is likely they can achieve equity; and, when there is a more equitable distribution of

goods and ills or capabilities among members of a society, it can lead to increased participation and improved functioning.

In addition to justice and its dialectical relationships with recognition, participation and capabilities, there have been studies that have focused on geographic principles in their attempts to explain environmental justice. According to Bullard (1996), environmental justice refers to the equal protection from environmental harms of all peoples, regardless of race, sex, income or age. Such a definition emphasizes equity as the essential part of environmental justice. For Bullard and colleagues (2007), environmental equity was distilled into three broad categories—namely, procedural, geographic and social equity. Procedural equity is concerned with fairness in environmental decision-making processes and attempts to address any such issues by working to ensure that rules, regulations and systematic evaluation criteria are applied in a uniform and nondiscriminatory manner. Geographic or spatial equity investigates whether environmental risks are equally distributed by geographic location and, in particular, the communities' proximity to hazardous and toxic facilities. Social equity evaluates how sociological factors such as race, ethnicity, class, culture, lifestyle and political power influence environmental decision making.

In equity studies, the spatial aspects have in the past received much attention from researchers and academics (e.g.Cutter & Solecki, 1996; Holifield, 2001; Bolin et al., 2000; Bullard, 1996). The siting of hazardous facilities in communities with large populations of people of color was the historic source of the environmental justice movement. The concerns of the first environmental justice advocates were grounded, at least in part, in two studies now considered canonical—one by the U.S. GAO (1983), the

other by the United Church of Christ's Commission for Racial Justice (1987); both were among the first to provide empirical evidence of environmental injustice (Cutter & Solecki, 1996; Holifield, 2001). Twenty years later, the original UCC study was re-conducted with a new dataset—U.S. Census data for the year 2000—and incorporated new methods (Bullard et al., 2007). That study showed that, "people of color are found to be more concentrated around hazardous waste facilities than previously shown" (Bullard et al., 2007a). Many other studies have suggested that low-income peoples and minorities bear disproportionate environmental and health-risk burdens (Pastor, Sadd, & Morello-Frosch, 2004; Konisky & Schario, 2010). Subsequent research, however, has produced mixed and not necessarily comparable results because of issues surrounding subject selection, geographic scale, population subgroups and time periods (Ringquist, 2005; Mohai, Pellow, & Roberts, 2009; Naphtali, Restrepo, & Zimmerman, 2007). While there does exist a large body of literature on industrial and other urban environmental risks and their implications as they pertain to issues of justice, few studies have as yet been extended to include commercial NPP locations.

There has been one previous study that has attempted to address environmental justice in the host communities of NPPs in the U.S. Alldred and Shrader-Frechette (2009) conducted a national study of the environmental injustice issues that face NPP sites. The study was more focused on the demographic characteristics of the host communities, however, and paid little attention to the notion procedural equity in the NPP siting decision. Their method included the evaluating of the demographics of populations living in census tracts that host a NPP, using census tract and zip code data. Their findings showed that environmental injustice was not obvious at the census-tract level, whereas it

was present and associated with measures of poverty at the zip-code level, and especially in the Southeastern U.S., where there is a disproportionately high percentage of African-Americans who live in poverty. The study has two limitations in my opinion. First, it looked only at geographic units—namely, zip codes and census tracts—that contained or hosted a NPP. Not all NPPs, however, are sited at the center point of their respective geographic units; some nuclear power facilities might be sited near the boundary of the host spatial units. Therefore, the areas and populations of neighboring units in fact may be closer to the NPP as compared to the population living in what is technically the host tract. Such a method may overestimate or underestimate the importance of the demographic characteristics of the populations living in the host geographic units depending on the location of the NPP and the scale of the geographic unit (Bullard et al., 2007a; Naphtali et al., 2007). Second, the study considered only U.S. census data from the year 2000. This being the case, the findings cannot be used to assess whether, for instance, vulnerable populations lived near a NPP 30 or more years ago, when the facility was first built. Some studies have argued that hazardous facilities are initially sited within a community and, over time, the wealthier residents abandon the area while the poor or otherwise disadvantaged groups move in (Brulle & Pellow, 2006). Some studies have suggested that low-income and minority populations tend to live in polluted areas because of the comparably lower rents available to them in such areas (Bowen et al., 1995; Pastor et al., 2004). To adequately assess the nature of demographic change over time in the host communities of NPPs, and to identify and define the related justice issues, it is necessary to use longitudinal data, in contrast to the study of Alldred and Frechette (2009). Doing so will allow for added clarity as to whether there were

inequities in place at the time of the NPP siting decision or if demographic changes that occurred after the fact might suggest environmental injustices. These issues warrant further investigation into questions of spatial inequities among populations living near commercial NPPs in the U.S.

2.4 The Study's Theoretical Underpinning

This study uses a distributive approach and undertakes a proximity-based assessment, intended to allow me to focus on geographic and social equity so that I might answer each of my four research questions. The study's conceptual framework is mainly based on the work of Bullard and colleagues (2007a), and considers three primary components: (1) the NPP; (2) the proximity of the host communities to the NPP; and, (3) the distribution of potential environmental hazards. This framework allows me to investigate whether environmental risks are equally distributed by spatial location and according to the respective communities' proximity to a NPP. When a group of people living near a NPP is seen to be bearing a greater share of the burden of potential hazards, it can be argued that there are environmental justice concerns.

2.5 Summary

First, the risks associated with NPPs are inevitable, inescapable, unpredictable, and unthinkable in their magnitude. Second, NPPs came into existence in the host communities in many instances without those communities being allowed to participate in the decision-making process. Third, environmental justice theories can be applied to explain distributive justice. These theories also can be utilized to understand distributional justice in NPP-hosting communities.

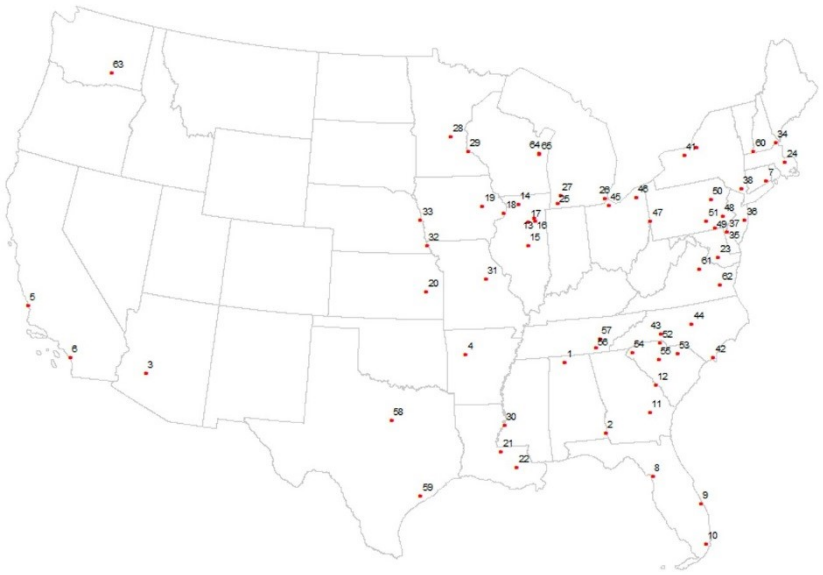
Chapter 3

RESEARCH METHODS

This chapter presents and defines the study area, variables, datasets, analytical tools and research methods that I utilized to examine the presence or absence of the environmental injustice issues that are the focus of this study. First, I discuss the study areas included in this analysis and the reasons for their inclusion. Second, I describe the study variables and how they were constructed. Third, I discuss the data analyzed in this study and their sources. Fourth, I discuss the tools utilized to conduct the statistical and spatial analyses. Fifth, I describe the methods of statistical analysis I employed in this study. Sixth, I discuss how the analyses are organized. Lastly, I summarize the materials presented in this chapter.

3.1 Study Areas

This study includes data from 104 U.S.-based commercial nuclear power reactors, distributed across 65 NPPs, as of January 2011 (Figure 1) (US NRC, 2012b). Many are clustered along the U.S. eastern seaboard; in fact, there are only 8 reactors at four NPPs in the American West. One reason for this concentration might be that the U.S. East coast has a greater demand for electricity consumption due to its denser population; another might be that the West coast is far more tectonically active, with some areas up to 100 times more likely to experience an earthquake than any place on the East coast. The NPPs sited on the East coast do not include in their designs technologies or design features meant to mitigate against strong earthquakes, and therefore cost less to build than would an otherwise-similar NPP on the West coast (Koch, 2011).



Index	Nuclear Power Plant, State	Index	Nuclear Power Plant, State
1	Browns Ferry, Alabama	34	Seabrook, New Hampshire
2	Farley, Alabama	35	Hope Creek, New Jersey
3	Palo Verde, Arizona	36	Oyster Creek, New Jersey
4	Arkansas Nuclear, Arkansas	37	Salem, New Jersey
5	Diablo Canyon, California	38	Indian Point, New York
6	San Onofre, California	39	FitzPatrick, New York
7	Millstone, Connecticut	40	Nine Mile Point, New York
8	Crystal River, Florida	41	Ginna, New York
9	Saint Lucie, Florida	42	Brunswick, North Carolina
10	Turkey Point, Florida	43	McGuire, North Carolina
11	Hatch, Georgia	44	Shearon Harris, North Carolina
12	Vogtle, Georgia	45	Davis-Besse, Ohio
13	Braidwood, Illinois	46	Perry, Ohio
14	Byron, Illinois	47	Beaver Valley, Pennsylvania
15	Clinton, Illinois	48	Limerick, Pennsylvania
16	Dresden, Illinois	49	Peach Bottom, Pennsylvania
17	La Salle, Illinois	50	Susquehanna, Pennsylvania
18	Quad Cities, Illinois	51	Three Mile Island, Pennsylvania
19	Duane Arnold, Iowa	52	Catawba, South Carolina
20	Wolf Creek, Kansas	53	Robinson, South Carolina
21	River Bend, Louisiana	54	Oconee, South Carolina
22	Waterford, Louisiana	55	Summer, South Carolina
23	Calvert Cliffs, Maryland	56	Sequoyah, Tennessee
24	Pilgrim, Massachusetts	57	Watts Bar, Tennessee
25	D.C. Cook, Michigan	58	Comanche Peak, Texas
26	Fermi, Michigan	59	South Texas, Texas
27	Palisades, Michigan	60	Vermont Yankee, Vermont
28	Monticello, Minnesota	61	North Anna, Virginia
29	Prairie Island, Minnesota	62	Surry, Virginia
30	Grand Gulf, Mississippi	63	Columbia, Washington
31	Callaway, Missouri	64	Kewaunee, Wisconsin
32	Cooper, Nebraska	65	Point Beach, Wisconsin
33	Fort Calhoun, Nebraska		

Figure 1. U.S. commercial NPPs in operation as of August 2012; decommissioned or otherwise inactive NPPs have been omitted (US NRC, (2012b).

This study includes two discrete study areas. One is those areas within a 50-mile radius of any one of the 65 U.S.-based NPPs (Figure 1); the other is those areas outside of a 50-mile radius and yet that are located in the state(s) that fall within said 50-mile radius. A list of the states included in such outside areas is provided in Appendix A (Table A.2). This study excludes from its analysis 20 reactors that have been permanently deactivated (Appendix A, Figure A.1). Among them, seven reactors are located at NPPs that otherwise remain active. These 20 reactors, it must be noted, do not pose the same level of risk as do reactors currently in operation, which pose increased risks as a result of their day-to-day operation, the possibility of core meltdown-type accident, and from their release of gaseous and liquid radioactive effluents. They may, however, pose a potential radiation risk as a result of any spent fuel that is stored on site. In order to ensure that this study compared apples to apples, these were not included.

3.2 Study Variables

I investigated the demographic characteristics of populations living in either of the two study areas described above. The demographic variables included both racial/ethnic and socio-economic variables. The racial/ethnic variables included the categories White, Black, Asian, Hispanic, Native American, Other and Color. They are defined as; (1) Percent White as percent of all non-Hispanic Whites; (2) Percent Black is as percent of non-Hispanic Blacks or African Americans; (3) Percent Asian as percent of Asian, and Native Hawaiian or Other Pacific Islander; (4) Percent Native American as percent of American Indian or Alaska Native; (5) Percent Other as percent of Some Other Race whose are not included in the White, Black, or African American, American Indian

or Alaska Native, Asian, and Native Hawaiian or Other Pacific Islander race categories; and (6) Percent Color as percent of all other races except non-Hispanic Whites; and (7) Percent Hispanic as percent of people who are Hispanic origin. The socio-economic variables selected for inclusion were renter-occupied housing, unemployment rate, percent living in poverty, mean household income, and percent composition at the census-tract level. The construction of the study variables is depicted in Appendix A (Table A.1).

In addition to the demographic variables here described, I included several other variables. To analyze any proximity-based disparities present in a given demographic variable I used distance from NPP, as measured in Euclidean distance from the census-tract center point to the NPP in miles. The measurement was performed using ENVI's ArcMap program. This distance variable was used to examine whether and how disparities in certain demographic characteristics were associated with distance from a NPP.

Other study variables relate to radioactive materials and radiation dosage levels. These include: radioactive effluents released from a reactor at a given NPP; the radiation dose able to be delivered by those effluents; and, the amount of radiation absorbed by the human body upon exposure.

3.3 Study Data

To answer the research questions set forth above, I first secured access to multiple datasets. To investigate demography-based disparities in the study areas required three discrete datasets. First, for demographic characteristics, I obtained data published by the

U.S. Census Bureau and GeoLytics—namely, (1) U.S. Census 1990, long form, normalized to 2010 census-tract boundaries (GeoLytics, 2012b); (2) U.S. Census 2000, long form, normalized to 2010 census-tract boundaries (GeoLytics, 2012a); and, (3) U.S. Census 2010/American Community Survey, 5-year estimate (GeoLytics, 2012c). The use of census tract boundaries normalized to those of 2010 for data collected as part of the 1990 and 2000 censuses was vital to this study, as it allowed me to compare census data from the 1990, 2000 and 2010 surveys. Since the data are only available at the census-tract level, this study takes a census tract as the base geographical unit of analysis. The datasets that result from each respective survey include racial and ethnic subgroups—namely, White-alone, Hispanic-alone, American Indian- or Alaskan Native-alone, Asian-alone, Black or African American-alone, Native Hawaiian or Other Pacific Islander-alone and Other-alone—as well as one additional category, "Two or more races", that is included only in the 2010 dataset. In addition, other socio-economic data—such as gender, age, income, poverty, employment status, education, housing situation (owner-occupied vs. renter-occupied) and citizenship status (native-born vs. naturalized)—was available from each survey.

Second, in order to regularize administrative boundaries so that I could conduct spatial analyses, I downloaded the national-level shapefiles that join the geometry and certain select attributes from the 2010 Census TIGER/Line Shapefiles and the 2010 U.S. Census Summary File 1 Demographic Profile (DP1) for the United States and Puerto Rico from the U.S. Census Bureau's website (The US Census Bureau, 2010).

Third, information including the location of each of the 104 nuclear reactors currently in operation in the U.S. was obtained from the NRC's website (NRC, 2012).

The data include general information on the reactors—namely, reactor type and containment type, design type, docket number, licensee, operating license issue date, commercial operation start date, renewed operation license issue date and operating license expiration date. I acquired latitude and longitude information for individual NPPs using Google Earth; the XY coordinates thus obtained were then manually entered into a separate sheet.

To study the extent and severity of exposure to radiation and radioactive effluents required that I access two datasets. First, radioactive effluents data from 2001–2008 were acquired via the Center for Advanced Energy Studies (Harris, 2013). The effluents data include both liquid and gaseous data for both pressurized water reactors (PWRs) and boiling water reactors (BWR). Gaseous effluents include fission- and activation-related gases, iodine, particulates and tritium. Liquid effluents include fission- and activation-related byproducts, dissolved and entrained gases, tritium and gross alpha activity. In addition, the file also contains data for individual radionuclides released from reactors, as measured in collective effective dose (CED) per unit.

Second, the reactor oversight dataset includes seven variables that inform on three strategic areas—reactor safety, radiation safety and safeguards. The seven variables are: initiating events, mitigating systems, barrier integrity, emergency preparedness, public radiation safety, occupational radiation safety and physical protection. These have been published in *1Q/2012 ROP Performance Indicators Summary* (US NRC, 2012a).

To study the atmospheric dispersion of radioactive effluents, I selected the Palo Verde NPP as a simulation site. I obtained meteorological data included in the annual radioactive effluents report issued by Palo Verde NPP, which is available through the

NRC. Meteorological data were selected from the Joint Frequency Distribution (JFD) tables published in the *2010 Annual Radioactive Effluent Release Report* for Palo Verde Nuclear Generating Station, Units 1, 2 and 3 (Kutner, 2010). The data includes meteorological data such as the number of observations for a particular category—for instance, wind speed, direction and stability—over a defined duration (quarterly, semiannually and annually).

To examine the risks of natural disaster associated with individual NPPs, I also obtained data regarding earthquakes, hurricanes, tornadoes and volcanoes from The Daily Beast's NPP vulnerability dataset (The Daily Beast, 2011). The data contain: earthquake information, measured on a 6-point scale based on the U.S. Geological Survey (USGS) map; hurricane predictions, based on historical data as compiled by the USGS; the number of predicted tornado days per century, based on a dataset spanning 1921–1995 (as complete and predictive a measure of tornadoes as is currently available); and, NPPs sorted by proximity to an active volcano.

3.4 Study Tools

I primarily used four tools to conduct the data analyses presented in this study. First, to conduct geospatial and statistical analyses, I used ArcMap 10.1 (ESRI, 2011). Second, to conduct the various statistical analyses, I used STATA 12 (StataCorp, 2011), which allowed me to analyze and manage data, produce graphics and conduct spatial regression analyses. Third, to analyze spatial autocorrelation, I used GeoDa, a free software program developed by the GeoDa Center for Geospatial Analysis and Computation at Arizona State University (Anselin, Syabri, & Kho, 2006). This software

is regarded as an introduction to spatial analyses and is designed to be partnered with Exploratory Spatial Data Analysis (ESDA) techniques. The program provides user-friendly features, including descriptive spatial analysis, spatial autocorrelation analysis and spatial regression analysis. Fourth, to estimate and assess atmospheric dispersion during radiological incidents and emergencies, I used the Radiological Assessment System for Consequence Analysis (RASCAL) version 4.3 code, developed by the NRC over 25 years (RSICC, 2013).

3.5 Study Methods

In the following paragraphs, I discuss the methods I employed in analyzing the available data in order to answer the four research questions posed in this study. The research methods, and the respective research questions on which they bear, are depicted in Figure 1.

In a proximity-based environmental justice study, the author must first define a distance around a hazard facility in order to set the study's boundaries between host and non-host areas, so that the demographic disparities between the respective resultant populations then can be compared and contrasted. As with other such research studies, this study investigates the disparities in the socio-demographic characteristics of populations living in two discrete areas—areas surrounding a NPP and the outlying areas. Populations living within a 50-mile radius of a NPP are considered to be occupying host communities; those living at a distance greater than 50 miles from any one NPP are therefore non-host communities. In many environmental justice studies, the distance used to define inclusion has been subject to criticism because the selected distance makes the

unrealistic assumption that the adverse effects of a hazard are or could be limited to or at a specified distance (Chakraborty, Maantay, & Brender, 2011). My decision to set this selection criteria at a 50-mile distance was based on the need to consider two zones defined by two exposure pathways: the plume exposure pathway zone, with a radius of approximately 10 miles from the reactor site, and the ingestion exposure pathway zone, with a radius of approximately 50 miles from the reactor site as defined by the NRC (US NRC, 2013e). The standard practice of using a 50-mile radius is itself subject to ongoing debate, however, as a group of more than 37 environmental and civic organizations have argued it to be inadequate to allow for full emergency preparedness, referring to the Chernobyl and Fukushima accidents (NIRS, 2013). Given the ongoing debate surrounding the definition of impacted areas, I selected the most current legal definitions of an impacted area, which was that area within a 50-mile radius of a NPP.

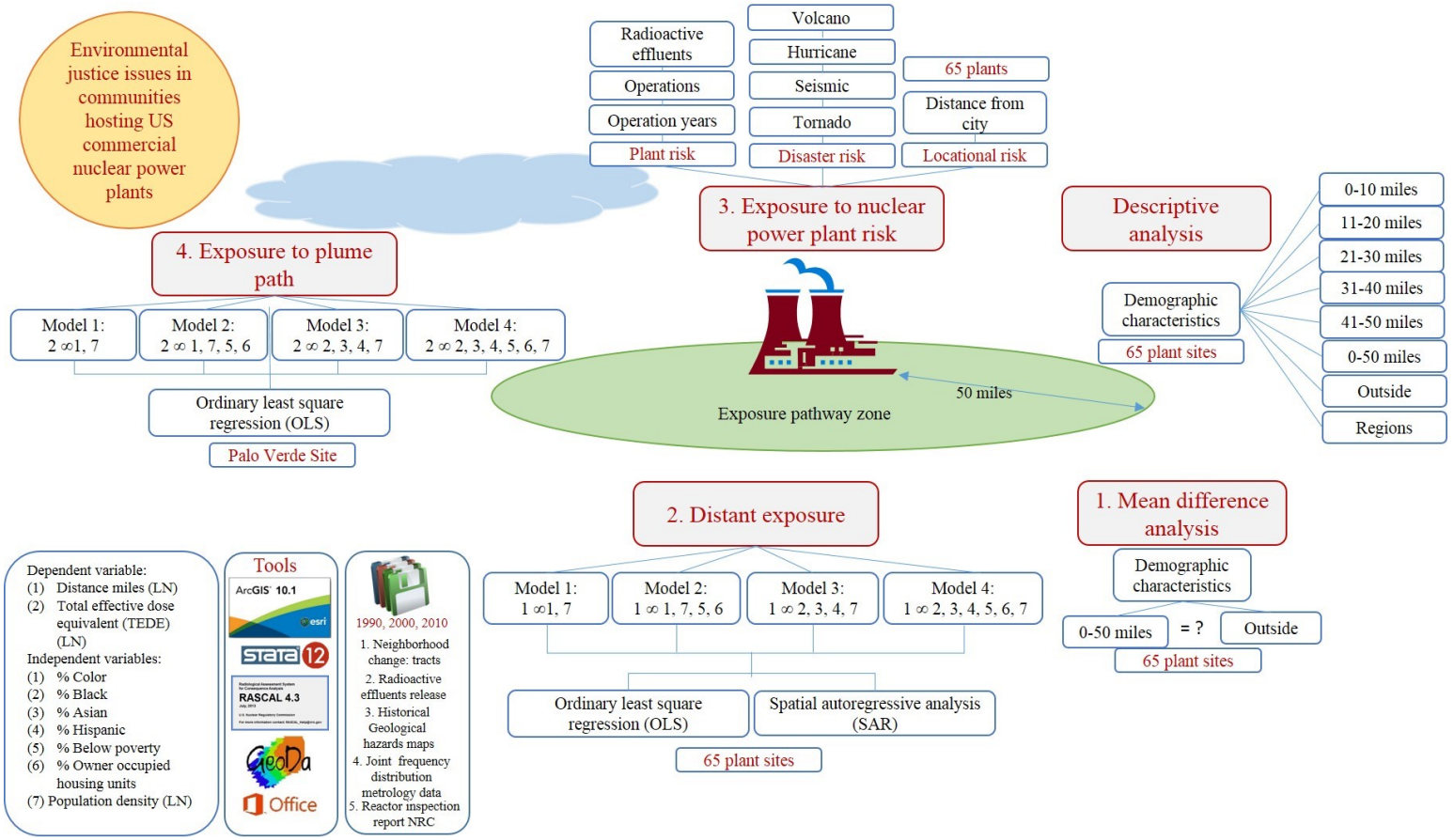


Figure 2. Organizational chart of study methods.\

There are in particular two analytical approaches that are commonly applied to provide estimates as part of environmental equity studies: the spatial-coincidence model and the distance-based approach (Bullard, 1990; Kearney & Kiros, 2009; Chakraborty et al., 2011). The former uses predefined geographical units that include a hazardous facility as the base unit of analysis (e.g., county, zip code). The shortcomings of this approach are its failure to take into account the proximity of the hazardous location to its surrounding units and the potential for the choice of unit of analysis to impact on any subsequent analyses (Chakraborty et al., 2011; Mohai & Saha, 2006).

To address the limitations of spatial-coincidence analysis I introduced a distance-based approach, which itself is comprised of two methods—namely, areal apportionment and centroid distance (Kearney & Kiros, 2009; Mohai & Saha, 2006). First, areal apportionment is included to account for the proximity between hazardous facilities and adjacent populations (e.g. Anderton, Anderson, Oakes, & Fraser, 1994; Downey, 2006; Mohai & Saha, 2006; Konisky & Schario, 2010). The estimates are performed with circular buffers set at arbitrary distances. The estimated population included within an exposure zone then is computed as:

$$Population = \sum_{i=0}^{n} p_i + \sum_{j=0}^{m} \left(p_j + \frac{a_j'}{a_j} \right) \ldots \text{equation (1)}$$

where n = the number of census tracts entirely contained within the exposure zone; p_i = the population of a census tract entirely contained within the exposure zone; $i = 0, 1, 2, \ldots, n$; m = the number of census tracts partly contained within the exposure zone; p_j = the population of a census tract partly contained within the exposure zone; $j = 0, 1, 2, \ldots, m$; and, a_j = the total area of all census tracts partly contained within the exposure zone.

One shortcoming of the areal apportionment method is its unrealistic assumption of a uniform distribution of population across geographical units such as census tracts (Chakraborty & Armstrong, 1995; Margai, 2001; Downey, 2006; Konisky & Schario, 2010). To address this shortcoming, distance was measured from the center point of the respective units, which provided me with the exact distance, for instance, between the center point of a census tract and the given hazard facility. This method has been widely used in a number of proximity-based environmental justice studies (e.g.Chakraborty & Zandbergen, 2007; Margai, 2001; Pollock, 1995; Stretesky & Lynch, 1999; Mennis, 2002), and has also been applied in studies that have attempted to measure the distributional equity of the provisioning of services or amenities (e.g. Boone, Buckley, Grove, & Sister, 2009). In addition to this exact-distance approach, past studies have also used a population-weighted center-point distance method that uses block-level population statistics to generate center points (Boone et al., 2009). The use of longitudinal data coupled with data normalized to fixed census boundaries in this study, however, does not allow for the use of the population-weighted center-point method because the weighted center point can be expected to have shifted over time.

With those pros and cons of the two analytical approaches in mind, I used the center point-distance approach to measure the exact distance between census-tract center point and the NPP. First, I determined the geographic center point of each included census tract in ArcMap 10.1. Next, I selected those geographic center points that fell within a 50-mile radius of the nearest NPP, identified using the "near" tool in ArcMap 10.1. This provided the exact distance between the census tracts' center points and the relevant NPP.

To answer Research Question 1, I computed descriptive statistics for the socio-demographic characteristics of populations living within a 50-mile radius of one of the 65 NPPs currently in operation in the U.S. as well as for populations living in the outlying areas. The populations living within 50 miles of a NPP were then further subdivided into five categories, defined by distance: 0–10 miles from a NPP, 11–20 miles, 21–30 miles, 31–40 miles and 41–50 miles; this was in addition to the broader category 0–50 miles. Using these six distance-based categories, I examined the demography of the populations living at each distance and included nearby NPPs described as national, regional, urban and individual (Figure 2). Next, I conducted statistical tests to investigate whether there were statistically significant differences in the demographic characteristics of populations living within a 50-mile radius as compared to those living in outlying areas. In doing so, I utilized two independent-sample T-tests to identify any differences in the socio-demographic compositions of the two areas. I conducted the T-test analyses in STATA 12.

To answer Research Question 2, I investigated what association there was, if any, between a community's distance from a NPP and its socio-demographic characteristics, for communities within a 50-mile radius of a NPP. In many past environmental justice studies, linear regression has been used to determine the significance of the association between socio-demographic characteristics such as race or ethnicity and a dependent variable, such as a risk indicator (Chakraborty et al., 2011). I utilized Ordinary Least Square linear regression (OLS) to look for any statistical associations that might exist between dependent and independent variables. I constructed four multiple-regression models with different combinations of racial/ethnic variables and other socioeconomic

variables in order to measure their impact on the dependent variable. Each of the four models used the natural log of distance, measured in miles between census-tract center point and NPP. The natural log transformation resulted in a normal distribution for the dependent variable. Near or far from a NPP is explained by predictors of demographic and socioeconomic variables. I calculated natural logs of population density as well, and include this as an independent variable in all four models, where it is considered one of the predictors of economic activity and industrial pollution (Ash & Fetter, 2004a; Pastor, Morello-Frosch, & Sadd, 2005). In models 1 and 3, I included variables based on race and ethnicity and on the natural log of population density; the racial/ethnic variables are: percent Color, percent Black, percent Hispanic and percent Asian. In models 2 and 4, I included socio-economic variables—namely, percent owner-occupied housing units and percent below poverty—to identify their association, if any, with the dependent variable. The OLS regression analyses were conducted at the national, regional, metro area and individual plant levels. The OLS regression analyses were conducted in STATA 12.

The use of spatial data in regression analyses failed to meet two basic assumptions made in an OLS regression, in particular—independence and homogeneity (Chakraborty et al., 2011). Chakraborty and colleagues (2011) argued that, given Tobler's (1970) first law of geography—"Everything is related to everything else, but near things are more related than distant things"—similarity, or in this case locational proximity, produces dependence in the distribution of observations and errors. This violates the assumptions of independence and homogeneity common to an OLS regression, a phenomenon known as the spatial autocorrelation problem (Chakraborty et al., 2011; Anselin, 2005). Many past environmental justice studies have attempted to

address the autocorrelation problem by applying spatial autoregressive models (Grineski & Collins, 2008; Chakraborty, 2009; Pastor et al., 2005). I conducted spatial autocorrelation analyses using GeoDa software (Anselin et al., 2006) and with STATA 12, using the "spwmatrix" command to analyze spatial econometrics (StaSacode, 2013).

After performing OLS regression analyses, I next had to check if the residuals of the OLS regression were independent. If the residuals were dependent, there existed a spatial autocorrelation problem. The analytical sequence is depicted in Appendix A (Figure A.2).

In this study, I employed spatial autoregressive models in which are used the spatial weight matrix of queen-based contiguity. A queen contiguity weight matrix selects neighbors that share boundaries and vertices with the spatial unit under examination (Anselin, 2005; Anselin, 2003).

When the analysis of OLS regressions was undertaken using a spatial weight matrix, Moran's I value was also computed. Results in which the Moran's I value is high and significantly different from zero were taken to indicate that there existed a spatial autocorrelation problem. The OLS regression otherwise presented no spatial autocorrelation problem.

The next step was to select a spatial autoregressive model—either the spatial-lag approach or the spatial-error approach. As is shown in the flow chart (Figure A.2), I first diagnosed whether it was appropriate to use either the spatial-lag or spatial-error model to correct the OLS regression (Anselin et al., 2006). Four indicators were considered as part the diagnostic process: The Lagrange Multiplier (error) was taken to be indicative of a missing spatially lagged variable, while the Lagrange Multiplier (lag) was taken to be

suggestive of missing error dependence. Next, Robust LM (Lag) and Robust LM (error) were used to more accurately diagnose LM-error and LM-lag.

After selecting the appropriate spatial autoregressive model, either lag or error, I estimated the spatial regression model and residuals tested for Moran's I with an inferential test that was computed with 9,999 permutations. If the resultant Moran's I value was low and not significantly different from zero, the model was seen to have minimized the extent of spatial dependence in the OLS regression.

To answer Research Question 3, I examined the levels of potential risk associated with NPPs and the socio-demographic characteristics of specific populations living within a 50-mile radius of a NPP. To estimate the level of risk, I created an index consisting of the risks associated with NPPs as well as the pertinent geological and climatological risks, including seismic activity, hurricanes, tornadoes, and volcanoes.

To answer Research Question 4, I performed an analysis that would inform as to whether any association existed between radioactive effluents and the demographic characteristics of populations during a core-damage accident. I used the NRC's RASCAL code to simulate a plume path (RSICC, 2013). After completing the projection, the plume footprint was exported as an ArcMap shapefile, which was imported into ArcMap and overlaid atop the census tracts and other spatial data. An OLS regression analysis was then performed to determine whether there existed any significant association between the dependent variable, the natural log of total effective dose equivalent (TEDE) and the independent variables.

3.6 Summary

In conclusion, in this chapter I discussed how I defined my study area, the study's variables, the datasets analyzed, and the tools and methodology applied. The study areas include those areas within a 50-mile radius of any one of the 65 U.S.-based commercial NPPs and the outlying areas. The study analyzes U.S. Census data for the years 1990, 2000 and 2010, doing so at the census-tract level, with tracts normalized to the 2010 U.S. Census boundaries. The study uses software that includes STATA 12, ArcMap 10.1, GeoDa, and RASCAL 4.3. The methods employed include a two-sample T-test, OLS regression analyses, spatial autoregressive models, a radioactive plume path dispersion model and the construction of a risk index.

Chapter 4

FINDINGS TO RESEARCH QUESTION 1

The overall aim of this chapter is to present my research findings pertaining to Research Question 1: Are disparities in the socio-demographic characteristics of the populations of communities within a 50-mile radius of a NPP greater than the same disparities of populations living in communities that are outside of a 50-mile radius from a NPP? And relatedly, did those disparities increase during the periods 1990–2000 and 2000–2010?

To address these questions I will present two types of findings—descriptive statistics and the statistical differences between host and non-host communities of a NPP sorted according to distance. Descriptive statistics of the socio-demographic characteristics of the host and non-host communities, respectively, are presented at both the aggregate level and for each of the 65 NPPs. The aggregate-level statistics inform on the overall characteristics of all of the communities that host one of the 65 commercial NPPs in the U.S., and do so at the national and regional levels, whereas the descriptive statistics that are provided at the individual-NPP level exhibit a wide degree of variation. In addition, the descriptive statistics provided at the individual-NPP level are useful for understanding how the spatial autoregressive analyses affect the selected socio-demographic characteristics at the individual-NPP, which will be necessary to my efforts to answer Research Question 2.

For the descriptive statistics, first I present the overall socio-demographic composition of communities as sorted into seven distance categories—namely, 0–10

miles from the nearest NPP, 11–20 miles, 21–30 miles, 31–40 miles, 41–50 miles, 0–50 miles, and outlying areas—with data for 1990, 2000, and 2010. Second, I present the overall socio-demographics of the communities of interest as sorted into four geographic regions—namely, West, Midwest, South, and Northeast—again for each year for which I have data. Lastly, I examine the socio-demographic characteristics at the individual-NPP level for the years 1990, 2000, and 2010.

To analyze the statistical differences between the two groups of communities, first I present my findings pertaining to the differences that exist in the socio-demographic characteristics between the two areas—those communities that are within a 50-mile radius of the nearest NPP and those that are outside of that same radius—at the national level. Second, I discuss my findings pertaining to the socio-demographic differences that exist between the two areas at the individual-NPP level. Third, I summarize my findings. Lastly, I highlight how my findings bear on issues of environmental justice.

4.1 Descriptive Statistics

4.1.1 Overall Demographic Composition by Distance

In this section, I will present three separate findings. First, I present the disparities that exist in certain socio-demographic characteristics, including racial, ethnic, and socio-economic variables, between those communities within a 50-mile radius from a NPP (i.e., host communities) and those communities outside of a 50-mile radius, based on U.S. Census data for the years 1990, 2000, and 2010. Second, I describe the disparities in those same socio-demographic characteristics for communities that fall within one of six distance categories—namely 0–10 miles from the nearest NPP, 11–20 miles, 21–30

miles, 31–40 miles, 41–50 miles, 0–50 miles, and those more than 50 miles from the nearest NPP, across the period spanning 1990–2010. Third, I discuss the overall socio-demographic characteristics of the populations living in NPP host communities and the trends in said variables for the years 1990, 2000, and 2010.

I found that as of 2010, a total of 96 million people lived within a 50-mile radius from the nearest NPP whereas an estimated 208 million people lived in what are here described as "outside areas" (Table 1), defined as areas that fall outside of a 50-mile radius form the nearest NPP. In other words, more than 3 persons out of every 10 (96 million out of 304 total US population) lived within a 50-mile radius of a NPP according to the 2010 U.S. Census. Among the communities located within such a radius, 71.1% of the population classified themselves as White, 16% Black, 15% Hispanic and 5% Asian, whereas among the communities located in outside areas, 75.1% of the population classified themselves as White, 10% Black, 16% Hispanic and 5% Asian. In addition, the category I label as "Color"—a container category that includes the total population excluding non-Hispanic Whites (see Appendix A, Table A.1)—was more prevalent among communities within a 50-mile radius of a NPP (37%) than among communities in outside areas (34%). In 2010, the overall U.S. population was 74.0% White, 13% Black, 16% Hispanic, and 5% Asian (and so, 34% Color). I observed that communities within a 50-mile radius of a NPP include fewer non-Hispanic White people as compared to communities in outside areas, and therefore those communities near to a NPP include a greater percent of people of other races and ethnic groups—namely, Black, Asian, and Hispanic—as compared to communities in outside areas. In comparison to those living in communities within a 50-mile radius of a NPP, the population of communities located in

outside areas are poorer (they earn lower than the average household income); are more likely to live renter-occupied housing units; are less likely to hold a college degree or higher; are more likely to be employed; and, are more likely to be native-born citizens of the U.S. There are no notable differences in either age or gender between the two areas. I identified similar patterns for the socio-demographic characteristics of the communities for the years 2000 (Table 2) and 1990 (Table 3).

Table 1

Demographic Composition of According to Area, sorted by Distance from any one of the 65 U.S.-Based Commercial NPPs, Based on 2010 American Community Survey Data

Demographic/Distance (Miles)	0-10	11-20	21-30	31-40	41-50	0-50	Outside#
Tracts	908	3,290	6,204	7,864	5,129	23,395	49,662
Tract area (sq. miles)	18,258	54,900	81,180	94,216	52,248	300,801	3,495,942
Total population	3,943,881	13,749,623	25,548,082	32,349,698	20,480,364	96,071,648	207,893,616
White	3,280,113	10,988,148	18,811,164	22,006,806	12,961,839	68,048,072	156,847,632
Black	408,088	1,593,169	4,078,036	5,595,517	3,807,400	15,482,210	22,496,542
Asian	81,047	398,638	958,199	1,849,310	1,588,819	4,876,013	9,801,153
Native American	11,233	41,975	77,305	125,688	76,503	332,704	2,147,761
Others	163,400	727,693	1,623,379	2,772,377	2,045,804	7,332,653	16,600,536
Hispanic	330,049	1,440,563	3,284,573	5,287,229	3,646,221	13,988,635	33,738,896
Color	880,263	3,661,789	8,704,444	13,187,954	9,366,389	35,800,840	71,591,664
White (%)	83.17	79.92	73.63	68.03	63.29	70.83	75.45
Black (%)	10.35	11.59	15.96	17.30	18.59	16.12	10.82
Asian (%)	2.06	2.90	3.75	5.72	7.76	5.08	4.71
Native American (%)	0.28	0.31	0.30	0.39	0.37	0.35	1.03
Others (%)	4.14	5.29	6.35	8.57	9.99	7.63	7.99
Hispanic (%)	8.37	10.48	12.86	16.34	17.80	14.56	16.23
Color (%)	22.32	26.63	34.07	40.77	45.73	37.26	34.44
Renter housing units (%)	22.17	25.66	28.78	33.05	34.54	30.69	28.73
College degree or higher (%)	28.11	30.22	29.97	30.27	29.98	30.03	26.90
Unemployed (%)	7.21	7.35	7.99	8.47	8.29	8.09	7.84
Poverty (%)	10.09	11.23	12.78	13.53	13.28	12.81	14.28
Mean household income ($)*	75,090	76,928	74,927	75,865	76,387	75,845	68,593

Note: Distance was measured between census-tract centroid points and NPP in miles. The category "Outside#" includes all areas within the U.S. that do not fall within a 50-mile radius of any one of the 65 U.S.-based NPPs. Mean household income is real dollar value as of 2010.

Table 2

Demographic Composition of According to Area, sorted by Distance from any one of the 65 U.S.-Based Commercial NPPs, Based on 2000 American Community Survey Data Normalized to 2010 U.S. Census Boundaries

Demographic/Distance (Miles)	0-10	11-20	21-30	31-40	41-50	0-50	Outside#
Tracts	908	3,290	6,204	7,864	5,129	23,395	49,662
Tract area (sq. miles)	18,258	54,900	81,180	94,216	52,248	300,801	3,495,942
Total population	3,462,639	12,549,504	24,021,128	31,031,720	19,531,042	90,596,032	190,825,872
White	2,967,500	10,340,303	18,184,338	21,605,748	12,720,314	65,818,204	145,535,520
Black	322,478	1,363,193	3,767,229	5,317,959	3,662,384	14,433,243	19,928,496
Asian	46,067	257,474	628,868	1,371,079	1,145,248	3,448,736	7,101,866
Native American	11,325	43,803	82,672	137,983	80,343	356,126	2,091,863
Others	115,385	544,534	1,358,065	2,598,859	1,922,802	6,539,645	16,168,205
Hispanic	182,469	926,000	2,343,231	4,081,065	2,830,356	10,363,121	24,875,360
Color	599,702	2,738,645	7,135,217	11,300,120	8,057,747	29,831,432	57,076,336
White (%)	85.70	82.40	75.70	69.62	65.13	72.65	76.27
Black (%)	9.31	10.86	15.68	17.14	18.75	15.93	10.44
Asian (%)	1.33	2.05	2.62	4.42	5.86	3.81	3.72
Native American (%)	0.33	0.35	0.34	0.44	0.41	0.39	1.10
Others (%)	3.33	4.34	5.65	8.37	9.84	7.22	8.47
Hispanic (%)	5.27	7.38	9.75	13.15	14.49	11.44	13.04
Color (%)	17.32	21.82	29.70	36.41	41.26	32.93	29.91
Renter housing units (%)	23.22	26.62	30.41	35.18	36.99	32.61	29.92
College degree or higher (%)	23.93	26.36	26.02	26.28	25.66	26.00	23.63
Unemployed (%)	4.76	4.84	5.67	5.97	6.33	5.76	5.78
Poverty (%)	8.89	9.36	11.44	12.30	12.79	11.64	12.73
Mean household income ($)*	73,790	76,448	74,420	75,114	75,252	75,095	68,422

Note: Distance was measured between census-tract centroid points and NPP in miles. The category "Outside#" includes all areas within the U.S. that do not fall within a 50-mile radius of any one of the 65 U.S.-based NPPs. Mean household income is real dollar value as of 2010.

Table 3

Demographic Composition of According to Area, sorted by Distance from any one of the 65 U.S.-Based Commercial NPPs, Based on 1990 American Community Survey Data Normalized to 2010 U.S. Census Boundaries

Demographic/Distance (Miles)	0-10	11-20	21-30	31-40	41-50	0-50	Outside#
Tracts	908	3,290	6,204	7,864	5,129	23,395	49,662
Tract area (sq. miles)	18,258	54,900	81,180	94,216	52,248	300,801	3,495,942
Total population	3,000,656	10,993,087	21,902,998	28,411,958	17,765,938	82,074,640	166,634,720
White	2,660,292	9,521,418	17,634,048	21,626,328	12,821,285	64,263,368	135,563,232
Black	267,856	1,129,307	3,306,932	4,743,254	3,328,346	12,775,695	17,154,732
Asian	29,007	155,171	392,028	854,679	712,228	2,143,113	5,083,769
Native American	10,030	33,101	63,304	110,277	61,509	278,221	1,736,823
Others	33,557	153,874	506,758	1,077,356	842,613	2,614,158	7,095,939
Hispanic	100,076	462,167	1,528,885	2,593,858	1,816,292	6,501,278	15,398,823
Color	402,059	1,766,880	5,228,348	8,116,981	5,787,093	21,301,360	38,983,632
White (%)	88.66	86.61	80.51	76.12	72.17	78.30	81.35
Black (%)	8.93	10.27	15.10	16.69	18.73	15.57	10.29
Asian (%)	0.97	1.41	1.79	3.01	4.01	2.61	3.05
Native American (%)	0.33	0.30	0.29	0.39	0.35	0.34	1.04
Others (%)	1.12	1.40	2.31	3.79	4.74	3.19	4.26
Hispanic (%)	3.34	4.20	6.98	9.13	10.22	7.92	9.24
Color (%)	13.40	16.07	23.87	28.57	32.57	25.95	23.39
Renter housing units (%)	25.11	28.02	31.89	36.70	38.20	34.12	31.26
College degree or higher (%)	18.73	21.62	21.43	22.14	21.36	21.59	19.71
Unemployed (%)	5.52	5.20	6.14	6.53	6.46	6.19	6.37
Poverty (%)	9.57	9.59	11.84	12.43	11.90	11.67	13.83
Mean household income ($)*	65,336	68,761	67,584	68,689	69,938	68,549	60,443

Note: Distance was measured between census-tract centroid points and NPP in miles. The category "Outside#" includes all areas within the U.S. that do not fall within a 50-mile radius of any one of the 65 U.S.-based NPPs. Mean household income is real dollar value as of 2010.

I also found that percent White was negatively associated with distance—that is, the greater the distance from a NPP, the lower the percentage of White people living in the communities. For the 2010 data, percent White was observed as 83.17%, 79.92%, 73.63%, 68.03%, and 63.29%, respectively, in the 0–10 miles, 11–20 miles, 21–30 miles, 31–40 miles, and 41–50 miles categories, respectively (Table 1). The percentages for other racial and ethnic groups—namely Black, Asian, Hispanic and Native American—meanwhile, were positively associated with distance; that is, the greater the distance from a NPP, the higher the percent of non-White peoples and households in the communities. Similarly, the percent of people living in poverty, the unemployment rate, the percent of people holding a college-degree and the mean household income were all positively associated with distance from a NPP. In contrast, the percent of native-born citizens was negatively associated with distance. Similar demographic patterns were observed in the U.S. Census data for the years 2000 (Table 2) and 1990 (Table 3), as well.

Interesting demographic trends emerged when I queried the data over the past three decades (Figure 3; Appendix A, Figures A.4 & A.5). First, there was a notable trend of decreasing percent White over the past three decades at every distance, with a corresponding increase in percent non-White over that same period (Appendix A, Figure A.4). A minimal increase is seen in both percent Black and percent Asian in each of the three years. From 1990 to 2000, the percent of people living in poverty and the percent unemployed showed a slight increase, while those same figures show a sharp increase from 2000 to 2010 (Appendix A, Figure A.5).

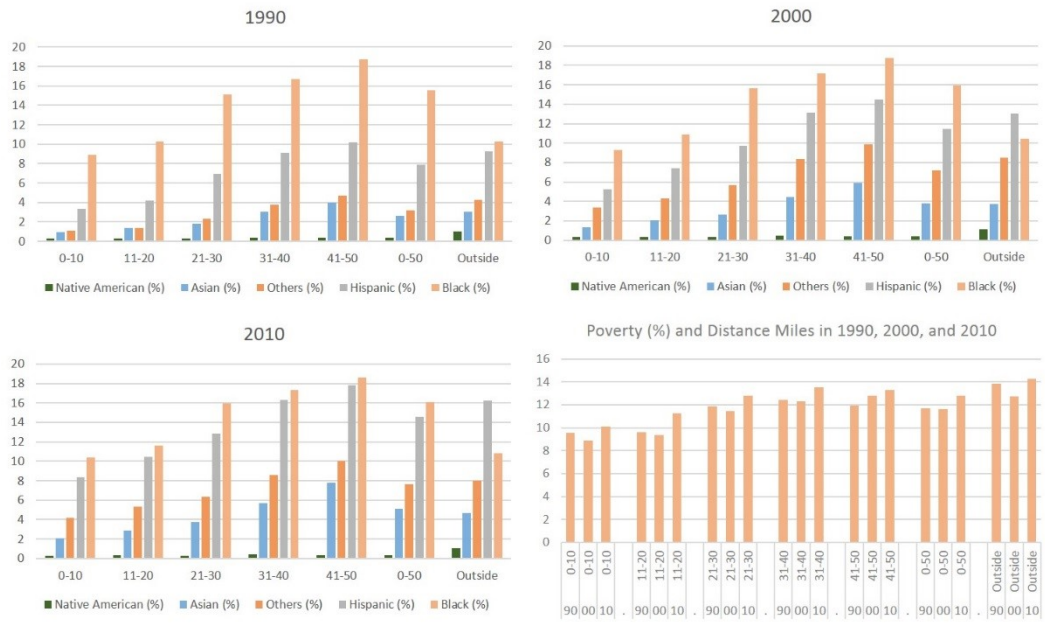


Figure 3. Demographic trends (race/ethnicity) in the areas surrounding any one of the 65 U.S.-based commercial NPPs, as sorted by distance.

4.1.2 Overall Demographic Composition by Region

There were approximately 9 million, 21 million, 28 million and 17 million people, respectively, living within a 50-mile radius of a NPP in the American West, Midwest, South and Northeast, respectively, as of 2010 (Table 4). In those areas, the highest percent White (76%) was observed in the Midwest, the lowest (66%) in the West. The highest percent Black (24%) was found among the host communities in the South, the lowest (4%) in the West. The highest percent Hispanic (35%) lived in the West, the lowest (7%) in the Northeast. The two regions with the highest percent Color were found in the West (53%) and South (41%). The percentage of the population that was unemployed was higher in those areas within a 50-mile radius of a NPP than compared to the outside areas for all regions except the Northeast, where percent unemployed among populations in the outlying areas was slightly higher than compared to that for

populations living within a 50-mile radius. The highest percentage of the population living in poverty was observed in the Northeast (12%). I also found that fewer people living within a 50-mile radius of a NPP were living below the poverty line than compared to those living in the outside areas for all four regions. The West (31%) and the Northeast (29%) contained the highest percent of residents who held a college degree or greater. Those living within a 50-mile radius of a NPP in the West registered the highest mean household income of any group defined for the purposes of this study ($87,013), while people living in the same such areas in the South registered the lowest mean household income ($67,952). Similar socio-demographic patterns were observed in the U.S. Census data for the years 2000 (Appendix A, Table A.4) and 1990 (Appendix A, Table A.5), as well.

Table 4

Demographic Composition of Host Communities (within a 50-mile Radius of Any One of 65 US Commercial NPPs) Compared to Non-Host Communities (Outside Areas) sorted by Region. Based on 2010 American Community Survey Data.

	West		Midwest		South		Northeast	
Demographic	0-50	Outside	0-50	Outside	0-50	Outside	0-50	Outside
Tracts	1,763	14,354	5,414	11,679	6,834	19,474	9,384	4,155
Tract area	18,272	1,854,981	89,649	732,074	138,327	782,118	54,552	126,769
Total population	8,696,616	61,772,356	20,872,242	45,641,848	28,475,768	83,597,224	38,027,024	16,882,196
White	5,769,818	43,334,592	15,964,166	38,563,212	19,569,480	60,336,952	26,744,604	14,612,877
Black	322,039	2,987,328	2,952,303	3,896,443	6,839,724	14,606,299	5,368,144	1,006,472
Asian	1,053,637	5,824,927	718,121	980,158	647,823	2,469,083	2,456,432	526,985
Native American	64,797	1,140,962	75,073	321,729	103,054	633,353	89,780	51,717
Others	1,486,325	8,484,550	1,162,579	1,880,307	1,315,686	5,551,535	3,368,063	684,144
Hispanic	3,016,994	16,651,716	1,776,235	2,622,864	3,737,362	13,290,745	5,458,044	1,173,573
Color	4,599,654	27,992,072	5,837,613	8,513,014	11,658,518	32,130,036	13,705,054	2,956,539
White (%)	66.35	70.15	76.49	84.49	68.72	72.18	70.33	86.56
Black (%)	3.70	4.84	14.14	8.54	24.02	17.47	14.12	5.96
Asian (%)	12.12	9.43	3.44	2.15	2.27	2.95	6.46	3.12
Native Ame. (%)	0.75	1.85	0.36	0.70	0.36	0.76	0.24	0.31
Others (%)	17.09	13.74	5.57	4.12	4.62	6.64	8.86	4.05
Hispanic (%)	34.69	26.96	8.51	5.75	13.12	15.90	14.35	6.95
Color (%)	52.89	45.31	27.97	18.65	40.94	38.43	36.04	17.51
Renter units (%)	32.99	34.24	25.85	25.88	27.22	27.36	35.61	24.83
Education (%)	31.02	29.22	28.40	25.55	26.47	25.52	33.31	28.98
Unemployed (%)	8.21	8.21	8.83	7.72	8.12	7.83	7.63	6.93
Poverty (%)	11.36	13.72	12.70	13.32	13.94	15.89	12.35	10.97
Mean income ($)	87,013	75,227	69,862	64,100	67,952	65,433	82,815	73,513

Note: Distance was measured between census-tract centroid points and NPP, in miles.

In the West region, the demographic trends (Figure 4) were similar to the trends evident in the overall demographic composition of the U.S., as discussed above (Figure 3). I observed that the percent White declined steeply from 1990 to 2000, while only a slight change occurred from 2000 to 2010 among those populations living in communities located within a 50-mile radius of a NPP. Percent Hispanic and percent Asian each showed a sharp increase from 1990 to 2000, and again from 2000 to 2010, while percent Black and percent Native American showed no significant change during those same periods. In each of the other three regions—the South, Midwest and Northeast—the demographic trends were similar to those observed in the West region (Appendix A, Figures A.6, A.7, A.8 & 9).

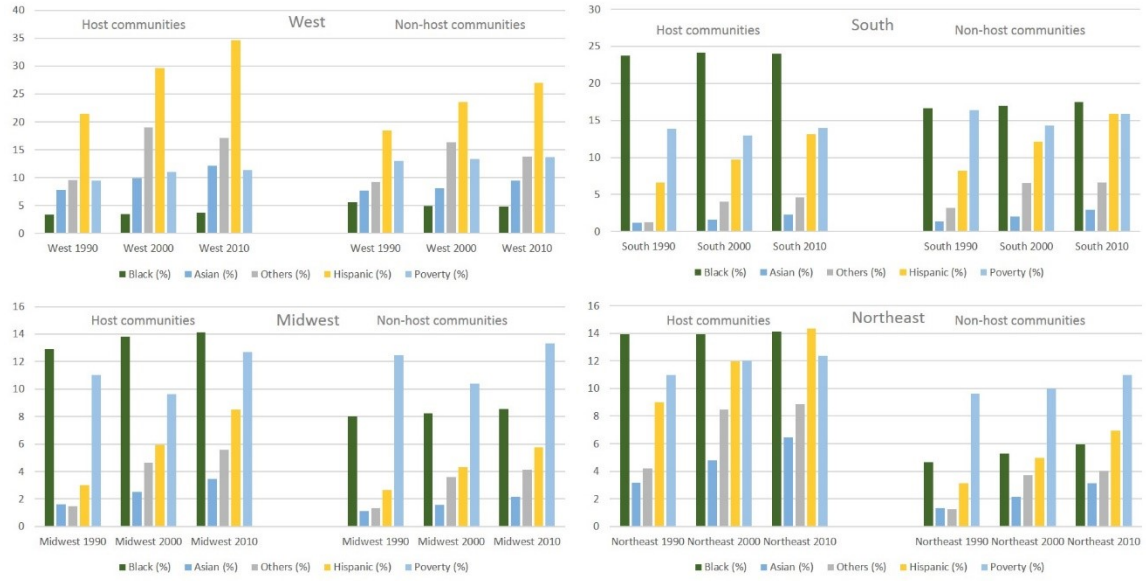


Figure 4. Demographic trends among populations living within a 50-mile radius of a commercial NPP in the U.S. four regions from 1990 to 2000 to 2010.

4.1.3 Demographic Composition of Host Communities at the Individual-NPP Level

In this section, first I discuss the demographic characteristics of the communities surrounding individual NPPs in areas within a 10-mile and within a 50-mile radius. Second, I discuss the percent change in total population of the communities sited in proximity to an individual NPP during the periods 1990–2000 and 2000–2010. Third, I discuss the percent change of the ethnic composition of the communities sited in areas within 0–10 miles, 11–20 miles, 21–30 miles, 31–40 miles and 41–50 miles of a NPP, and of those sited in outside areas.

Analysis and discussion of the socio-demographic composition of the host communities considers those populations living in communities sited within a 10-mile and a 50-mile radius of a NPP, respectively. First, each NPP was ranked according to the total population living within a 10-mile radius according to 2010 U.S. Census data. The total such population varies from just 2,654, near South Texas Project, Texas, to as much as 257,462, at Limerick Generating Station, Pennsylvania (Table 5)—approximately 0.06% of the total U.S. population lives within a 10-mile radius of the Limerick Generating Station (Figure 6). The ten NPPs with the largest population living in such close proximity as of 2010 were: (1) Limerick Generating Station, Pennsylvania, 257,462; (2) Indian Point Nuclear Generating, New York, 253,977; (3) St. Lucie Plant, Florida, 209,961; (4) Catawba Nuclear Station, South Carolina, 200,869; (5) Three Mile Island Nuclear Station, Pennsylvania, 191,325; (6) McGuire Nuclear Station, North Carolina, 188,937; (7) Turkey Point Nuclear Generating, Florida, 147,705; (8) Surry Nuclear Power Station, Virginia, 133,856; (9) Oyster Creek Nuclear Generating Station, New Jersey, 128,893; and, (10) Seabrook Station, New Hampshire, 120,876. The three

NPPs with the smallest total populations living within a 10-mile radius as of 2010 were: (1) South Texas Project, Texas, 2,654; (2) Palo Verde Nuclear Generating Station, Arizona, 3,090; and, (3) Columbia Generating Station, Washington, 6,007 (Table 5). In 2000, among the ten NPPs with the largest such populations as of 2010, Beaver Valley Power Station, Pennsylvania, and Millstone Power Station, Connecticut, replaced Turkey Point Nuclear Generating, Florida, and Oyster Creek Nuclear Generating Station, New Jersey (Appendix A, Table A.6); the three NPPs with the smallest such populations were the same in 2000 (Appendix A, Table A.6). In 1990, among the top-ten such NPPs as of 2000, Oyster Creek Nuclear Generating Station, New Jersey, replaced Millstone Power Station, Connecticut, while the bottom-three NPPs in terms of such population again were unchanged (Appendix A, Table A.7).

Second, I also considered the total population living within a 50-mile radius of a NPP in 1990, 2000 and 2010. The total population of communities sited in such areas ranged between 111,113 and 15 million (Table 5); approximately 5% of the total U.S. population as of 2010 lived within a 50-mile radius of Indian Point Nuclear Generating Station. The ten NPPs with the largest total population living within a 50-mile radius were: (1) Indian Point Nuclear Generating, New York, 15,118,181; (2) San Onofre Nuclear Generating Station, California, 6,779,932; (3) Limerick Generating Station, Pennsylvania, 6,559,209; (4) Dresden Nuclear Power Station, Illinois, 4,700,949; (5) Hope Creek Generating Station, New Jersey, 4,372,701; (6) Fermi, Michigan, 4,368,235; (7) Salem Nuclear Generating Station, New Jersey, 4,328,469; (8) Peach Bottom Atomic Power Station, Pennsylvania, 4,124,024; (9) Seabrook Station, New Hampshire, 3,767,215; and, (10) Turkey Point Nuclear Generating, Florida, 3,318,548. The three

NPPs with the smallest such populations were: (1) Cooper Nuclear Station, Nebraska, 111,113; (2) Wolf Creek Generating Station, Kansas, 138,464; and, (3) Arkansas Nuclear One, Arkansas, 194,963. In 2000, among the ten NPPs with the largest such populations as of 2010, Pilgrim Nuclear Power Station, Massachusetts, replaced Turkey Point Nuclear Generating, Florida (Appendix A, Table A.6). In 1990, among the ten NPPs with the largest such populations as of 2000, Turkey Point Nuclear Generating, Florida, replaced Pilgrim Nuclear Power Station, Massachusetts (Appendix A, Table A.7). The three NPPs with the smallest such populations were unchanged relative to 2010 in both 2000 (Appendix A, Table A.6) and 1990 (Appendix A, Table A.7).

Table 5

Total Population Living in Census Tracts within a 10-Mile and a 50-Mile Radius of a NPP as of 2010, as Measured from Census Tract Centroid Point to NPP

Index	State	Plant	10-mile	10-mile rank	50-mile	50-mile rank
1	Alabama	Browns Ferry Nuclear Plant	40,292	32	885374	40
2	Alabama	Joseph M. Farley Nuclear Plant	17,021	53	360352	59
3	Arizona	Palo Verde Nuclear Generating Station	3,090	64	2207889	18
4	Arkansas	Arkansas Nuclear One	43,212	30	194963	63
5	California	Diablo Canyon Nuclear Power Plant	27,776	42	448292	55
6	California	San Onofre Nuclear Generating Station	104,718	13	6779932	2
7	Connecticut	Millstone Power Station	118,025	11	1667925	25
8	Florida	Crystal River Nuclear Generating Plant	21,423	49	884342	41
9	Florida	St. Lucie Plant	206,961	3	1151024	31
10	Florida	Turkey Point Nuclear Generating	147,705	7	3318548	10
11	Georgia	Edwin I. Hatch Nuclear Plant	10,422	59	304217	60
12	Georgia	Vogtle Electric Generating Plant	8,333	62	628353	49
13	Illinois	Braidwood Station	35,921	33	3018399	12
14	Illinois	Byron Station	23,750	45	821645	43
15	Illinois	Clinton Power Station	12,773	54	608176	50
16	Illinois	Dresden Nuclear Power Station	73,784	19	4700949	4
17	Illinois	LaSalle County Station	12,195	55	1137865	32
18	Illinois	Quad Cities Nuclear Power Station	32,223	36	544388	51
19	Iowa	Duane Arnold Energy Center	95,814	15	543720	52
20	Kansas	Wolf Creek Generating Station	8,587	61	138464	64
21	Louisiana	River Bend Station	18,786	52	814822	44
22	Louisiana	Waterford Steam Electric Station	73,071	20	1656164	26
23	Maryland	Calvert Cliffs Nuclear Power Plant	48,285	27	1719445	23
24	Massachusetts	Pilgrim Nuclear Power Station	69,440	21	3130058	11
25	Michigan	Donald C. Cook Nuclear Power Plant	53,507	26	873728	42
26	Michigan	Fermi	85,991	16	4368235	6
27	Michigan	Palisades Nuclear Plant	33,432	35	899600	38
28	Minnesota	Monticello Nuclear Generating Plant	56,001	24	1950169	20
29	Minnesota	Prairie Island Nuclear Generating Plant	25,260	43	1800095	21
30	Mississippi	Grand Gulf Nuclear Station	12,168	56	210536	62
31	Missouri	Callaway Plant	11,642	57	392917	57
32	Nebraska	Cooper Nuclear Station	9,770	60	111113	65
33	Nebraska	Fort Calhoun Station	18,933	51	890963	39
34	New Hampshire	Seabrook Station	120,876	10	3767215	9
35	New Jersey	Hope Creek Generating Station	47,275	28	4372701	5
36	New Jersey	Oyster Creek Nuclear Generating Station	128,893	9	2538550	14
37	New Jersey	Salem Nuclear Generating Station	47,275	29	4328469	7
38	New York	Indian Point Nuclear Generating	253,977	2	15118181	1
39	New York	James A. FitzPatrick Nuclear Power Plant	29,580	38	747467	46
40	New York	Nine Mile Point Nuclear Station	29,580	39	744267	47
41	New York	R.E. Ginna Nuclear Power Plant	65,466	22	1035214	34
42	North Carolina	Brunswick Steam Electric Plant	28,812	41	402395	56
43	North Carolina	McGuire Nuclear Station	188,937	6	2517850	15
44	North Carolina	Shearon Harris Nuclear Power Plant	84,598	17	2222038	17
45	Ohio	Davis-Besse Nuclear Power Station	23,312	47	1349593	28
46	Ohio	Perry Nuclear Power Plant	80,167	18	1699459	24
47	Pennsylvania	Beaver Valley Power Station	108,656	12	2655595	13
48	Pennsylvania	Limerick Generating Station	257,462	1	6559209	3
49	Pennsylvania	Peach Bottom Atomic Power Station	43,032	31	4124024	8
50	Pennsylvania	Susquehanna Steam Electric Station	55,117	25	1136292	33
51	Pennsylvania	Three Mile Island Nuclear Station	191,325	5	2068685	19
52	South Carolina	Catawba Nuclear Station	200,869	4	2235497	16
53	South Carolina	H. B. Robinson Steam Electric Plant	33,936	34	649720	48
54	South Carolina	Oconee Nuclear Station	64,579	23	1152820	30
55	South Carolina	Virgil C. Summer Nuclear Station	22,287	48	971019	35
56	Tennessee	Sequoyah Nuclear Plant	104,716	14	937320	36
57	Tennessee	Watts Bar Nuclear Plant	24,916	44	812206	45
58	Texas	Comanche Peak Steam Electric Station	28,892	40	1220100	29
59	Texas	South Texas Project	2,654	65	216206	61
60	Vermont	Vermont Yankee Nuclear Power Plant	32,118	37	937195	37
61	Virginia	North Anna Power Station	23,603	46	1553358	27
62	Virginia	Surry Nuclear Power Station	133,856	8	1741096	22
63	Washington	Columbia Generating Station	6,007	63	365409	58
64	Wisconsin	Kewaunee Power Station	10,516	58	489082	53
65	Wisconsin	Point Beach Nuclear Plant	19,752	50	485589	54
		Total population living nearby areas	3,943,881		96,071,649	
		Total population living outside areas	419,232,968		207,893,623	
		Total population in US	423,176,849		303,965,272	

I tracked the percent change in population size within both a 10-mile and a 50-mile radius during the periods 1990–2000 and 2000–2010. Among communities sited within a 10-mile radius of a NPP from 2000 to 2010, there was an increase in total population at 49 NPPs, while at the remaining 16 NPPs the total such population declined. The percent change ranged from a 61% increase, in the area surrounding McGuire Nuclear Station, North Carolina (Figure 6), to a 31% decrease among the communities surrounding Diablo Canyon Nuclear Power Plant, California. Large positive percent changes during the period 2000–2010, also occurred in the areas immediately surrounding Brunswick Steam Electric Plant, North Carolina, 55%, and Shearon Harris Nuclear Power Plant, North Carolina, 55%; a large negative percent change also occurred in the area surrounding Grand Gulf Nuclear Station, Mississippi (-16%). From 1990 to 2000, the largest percent change in total population living within a 10-mile radius of a NPP occurred at Shearon Harris Nuclear Power Plant, North Carolina (121%); the communities surrounding McGuire Nuclear Station, North Carolina, also experienced dramatic population growth (91%).

Fifty-six NPPs saw a positive percent change, or an increase in the population living in communities sited within a 50-mile radius; the remaining 9 NPPs saw a decrease in such populations from 2000 to 2010 (Figure 6). The percent-change range varied between 28% to -7%. The largest percent change occurred among the communities sited within a 50-mile radius of LaSalle County Station, Illinois (28%); Palo Verde Nuclear Generating Station, Arizona saw the largest percent change in the growth of its same such population during the period 1990–2000 (39%). Brunswick Steam Electric Plant, North Carolina (27%), and Crystal River Nuclear Generating Plant, Florida (27%) also saw

significant growth in the population living within a 50-mile radius of each respective NPP. The largest negative percent change, -7%, occurred among the communities within a 50-mile radius of Waterford Steam Electric Station, Louisiana.

Overall, the total population in areas within a 10-mile radius of one of the 65 U.S.-based commercial NPPs increased 14% during the period 2000–2010 and 15% during the period 1990–2000, while the total population in all other places outside of a 50-mile radius of any NPP saw increases of 38% and 23%, respectively, during the periods 1990–2000 and 2000–2010, respectively (Figures 6 & 7). The total population of communities sited within a 50-mile radius of any one of the 65 NPPs increased 6% and 10%, respectively, during the periods 2000–2010 and 1999–2000, respectively, while the total population in all other areas of the country increased 9% and 14%, respectively, during the periods 2000–2010 and 1990–2000, respectively (Figures 6 & 7).

Index	State	Plant	1900-2000 10-mile	2000-2010 10-mile	1900-2000 50-mile	2000-2010 50-mile
43	North Carolina	McGuire Nuclear Station	90.56	61.12	26.65	21.49
42	North Carolina	Brunswick Steam Electric Plant	36.56	54.58	36.34	27.03
44	North Carolina	Shearon Harris Nuclear Power Plant	121.42	54.53	31.33	21.43
10	Florida	Turkey Point Nuclear Generating	11.39	48.40	21.50	9.73
3	Arizona	Palo Verde Nuclear Generating Station	54.73	46.31	38.90	22.67
52	South Carolina	Catawba Nuclear Station	35.73	46.20	26.58	22.85
63	Washington	Columbia Generating Station	23.63	37.65	29.21	20.63
16	Illinois	Dresden Nuclear Power Station	22.83	34.55	13.64	6.04
28	Minnesota	Monticello Nuclear Generating Plant	47.06	31.96	15.34	9.46
9	Florida	St. Lucie Plant	19.07	31.53	27.11	23.66
55	South Carolina	Virgil C. Summer Nuclear Station	27.48	22.63	15.50	12.19
58	Texas	Comanche Peak Steam Electric Station	45.54	21.17	19.12	16.18
61	Virginia	North Anna Power Station	32.43	20.86	21.88	17.46
35	New Jersey	Hope Creek Generating Station	15.79	17.53	3.38	4.37
37	New Jersey	Salem Nuclear Generating Station	15.79	17.53	3.39	4.35
56	Tennessee	Sequoyah Nuclear Plant	18.43	15.92	14.40	9.58
48	Pennsylvania	Limerick Generating Station	20.49	15.68	4.95	4.40
6	California	San Onofre Nuclear Generating Station	13.81	14.86	19.31	11.93
4	Arkansas	Arkansas Nuclear One	17.78	14.52	18.52	6.61
8	Florida	Crystal River Nuclear Generating Plant	13.54	13.10	28.38	26.74
36	New Jersey	Oyster Creek Nuclear Generating Station	24.69	12.77	11.93	6.35
54	South Carolina	Oconee Nuclear Station	12.98	10.68	18.08	11.79
62	Virginia	Surry Nuclear Power Station	11.96	10.16	7.95	5.83
41	New York	R.E. Ginna Nuclear Power Plant	19.32	10.01	3.35	1.47
57	Tennessee	Watts Bar Nuclear Plant	27.53	9.74	18.59	11.07
13	Illinois	Braidwood Station	16.71	9.31	14.84	11.04
17	Illinois	LaSalle County Station	3.08	9.23	29.79	28.31
31	Missouri	Callaway Plant	32.03	8.54	16.39	9.84
51	Pennsylvania	Three Mile Island Nuclear Station	13.25	7.92	10.89	8.53
22	Louisiana	Waterford Steam Electric Station	9.50	7.66	7.39	-6.87
2	Alabama	Joseph M. Farley Nuclear Plant	5.15	7.17	8.41	4.86
49	Pennsylvania	Peach Bottom Atomic Power Station	12.96	6.53	7.73	7.24
33	Nebraska	Fort Calhoun Station	13.60	6.25	11.30	9.49
19	Iowa	Duane Arnold Energy Center	16.84	6.13	10.26	6.52
46	Ohio	Perry Nuclear Power Plant	10.27	5.49	1.28	-4.98
12	Georgia	Vogtle Electric Generating Plant	19.61	5.10	13.39	6.99
53	South Carolina	H. B. Robinson Steam Electric Plant	6.44	5.08	8.46	5.46
24	Massachusetts	Pilgrim Nuclear Power Station	11.69	5.08	5.87	1.68
38	New York	Indian Point Nuclear Generating	5.34	4.88	8.03	1.51
1	Alabama	Browns Ferry Nuclear Plant	6.57	4.28	13.49	8.91
29	Minnesota	Prairie Island Nuclear Generating Plant	7.74	3.97	15.12	6.71
26	Michigan	Fermi	5.05	3.76	1.18	-3.85
14	Illinois	Byron Station	16.04	3.71	9.47	6.22
50	Pennsylvania	Susquehanna Steam Electric Station	2.93	3.37	1.28	1.77
34	New Hampshire	Seabrook Station	15.59	3.19	6.29	2.27
21	Louisiana	River Bend Station	12.52	2.59	12.37	10.44
7	Connecticut	Millstone Power Station	-3.04	2.45	4.44	4.92
60	Vermont	Vermont Yankee Nuclear Power Plant	1.63	1.25	1.96	2.90
23	Maryland	Calvert Cliffs Nuclear Power Plant	44.17	0.16	9.93	7.09
25	Michigan	Donald C. Cook Nuclear Power Plant	4.08	-0.61	6.46	1.38
45	Ohio	Davis-Besse Nuclear Power Station	2.18	-0.80	0.78	-0.33
11	Georgia	Edwin I. Hatch Nuclear Plant	11.26	-0.97	16.75	6.89
39	New York	James A. FitzPatrick Nuclear Power Plant	-1.26	-1.00	-1.54	0.26
40	New York	Nine Mile Point Nuclear Station	-1.26	-1.00	-1.58	0.25
18	Illinois	Quad Cities Nuclear Power Station	-2.90	-1.65	1.50	-0.59
15	Illinois	Clinton Power Station	0.22	-2.12	5.33	5.33
20	Kansas	Wolf Creek Generating Station	5.49	-3.14	5.39	-1.80
27	Michigan	Palisades Nuclear Plant	1.35	-3.36	11.05	1.93
64	Wisconsin	Kewaunee Power Station	2.54	-3.80	10.53	5.14
32	Nebraska	Cooper Nuclear Station	-7.88	-4.26	-1.30	-4.10
65	Wisconsin	Point Beach Nuclear Plant	-0.41	-5.13	10.38	5.17
47	Pennsylvania	Beaver Valley Power Station	-2.71	-6.24	-2.36	-3.71
59	Texas	South Texas Project	-11.91	-6.81	8.25	0.31
30	Mississippi	Grand Gulf Nuclear Station	4.99	-15.75	1.99	-3.82
5	California	Diablo Canyon Nuclear Power Plant	3.29	-31.32	13.32	9.46
		All 65 plants in operation	15.40	13.90	10.38	6.04
		All 65 plants in operation-outside	23.28	38.41	14.52	8.94

Figure 5. Percent change of the total population living in census tracts within a 10-mile and 50-mile radius, as measured from census tract centroid point to the nearest NPP, during the periods 1990–2000 and 2000–2010, sorted according to percent change within a 10-mile radius.

Index	State	Plant	1900-2000 10-mile	2000-2010 10-mile	1900-2000 50-mile	2000-2010 50-mile
17	Illinois	LaSalle County Station	3.08	9.23	29.79	28.31
42	North Carolina	Brunswick Steam Electric Plant	36.56	54.58	36.34	27.03
8	Florida	Crystal River Nuclear Generating Plant	13.54	13.10	28.38	26.74
9	Florida	St. Lucie Plant	19.07	31.53	27.11	23.66
52	South Carolina	Catawba Nuclear Station	35.73	46.20	26.58	22.85
3	Arizona	Palo Verde Nuclear Generating Station	54.73	46.31	38.90	22.67
43	North Carolina	McGuire Nuclear Station	90.56	61.12	26.65	21.49
44	North Carolina	Shearon Harris Nuclear Power Plant	121.42	54.53	31.33	21.43
63	Washington	Columbia Generating Station	23.63	37.65	29.21	20.63
61	Virginia	North Anna Power Station	32.43	20.86	21.88	17.46
58	Texas	Comanche Peak Steam Electric Station	45.54	21.17	19.12	16.18
55	South Carolina	Virgil C. Summer Nuclear Station	27.48	22.63	15.50	12.19
6	California	San Onofre Nuclear Generating Station	13.81	14.86	19.31	11.93
54	South Carolina	Oconee Nuclear Station	12.98	10.68	18.08	11.79
57	Tennessee	Watts Bar Nuclear Plant	27.53	9.74	18.59	11.07
13	Illinois	Braidwood Station	16.71	9.31	14.84	11.04
21	Louisiana	River Bend Station	12.52	2.59	12.37	10.44
31	Missouri	Callaway Plant	32.03	8.54	16.39	9.84
10	Florida	Turkey Point Nuclear Generating	11.39	48.40	21.50	9.73
56	Tennessee	Sequoyah Nuclear Plant	18.43	15.92	14.40	9.58
33	Nebraska	Fort Calhoun Station	13.60	6.25	11.30	9.49
28	Minnesota	Monticello Nuclear Generating Plant	47.06	31.96	15.34	9.46
5	California	Diablo Canyon Nuclear Power Plant	3.29	-31.32	13.32	9.46
1	Alabama	Browns Ferry Nuclear Plant	6.57	4.28	13.49	8.91
51	Pennsylvania	Three Mile Island Nuclear Station	13.25	7.92	10.89	8.53
49	Pennsylvania	Peach Bottom Atomic Power Station	12.96	6.53	7.73	7.24
23	Maryland	Calvert Cliffs Nuclear Power Plant	44.17	0.16	9.93	7.09
12	Georgia	Vogtle Electric Generating Plant	19.61	5.10	13.39	6.99
11	Georgia	Edwin I. Hatch Nuclear Plant	11.26	-0.97	16.75	6.89
29	Minnesota	Prairie Island Nuclear Generating Plant	7.74	3.97	15.12	6.71
4	Arkansas	Arkansas Nuclear One	17.78	14.52	18.52	6.61
19	Iowa	Duane Arnold Energy Center	16.84	6.13	10.26	6.52
36	New Jersey	Oyster Creek Nuclear Generating Station	24.69	12.77	11.93	6.35
14	Illinois	Byron Station	16.04	3.71	9.47	6.22
16	Illinois	Dresden Nuclear Power Station	22.83	34.55	13.64	6.04
62	Virginia	Surry Nuclear Power Station	11.96	10.16	7.95	5.83
53	South Carolina	H. B. Robinson Steam Electric Plant	6.44	5.08	8.46	5.46
15	Illinois	Clinton Power Station	0.22	-2.12	5.33	5.33
65	Wisconsin	Point Beach Nuclear Plant	-0.41	-5.13	10.38	5.17
64	Wisconsin	Kewaunee Power Station	2.54	-3.80	10.53	5.14
7	Connecticut	Millstone Power Station	-3.04	2.45	4.44	4.92
2	Alabama	Joseph M. Farley Nuclear Plant	5.15	7.17	8.41	4.86
48	Pennsylvania	Limerick Generating Station	20.49	15.68	4.95	4.40
35	New Jersey	Hope Creek Generating Station	15.79	17.53	3.38	4.37
37	New Jersey	Salem Nuclear Generating Station	15.79	17.53	3.39	4.35
60	Vermont	Vermont Yankee Nuclear Power Plant	1.63	1.25	1.96	2.90
34	New Hampshire	Seabrook Station	15.59	3.19	6.29	2.27
27	Michigan	Palisades Nuclear Plant	1.35	-3.36	11.05	1.93
50	Pennsylvania	Susquehanna Steam Electric Station	2.93	3.37	1.28	1.77
24	Massachusetts	Pilgrim Nuclear Power Station	11.69	5.08	5.87	1.68
38	New York	Indian Point Nuclear Generating	5.34	4.88	8.03	1.51
41	New York	R.E. Ginna Nuclear Power Plant	19.32	10.01	3.35	1.47
25	Michigan	Donald C. Cook Nuclear Power Plant	4.08	-0.61	6.46	1.38
59	Texas	South Texas Project	-11.91	-6.81	8.25	0.31
39	New York	James A. FitzPatrick Nuclear Power Plant	-1.26	-1.00	-1.54	0.26
40	New York	Nine Mile Point Nuclear Station	-1.26	-1.00	-1.58	0.25
45	Ohio	Davis-Besse Nuclear Power Station	2.18	-0.80	0.78	-0.33
18	Illinois	Quad Cities Nuclear Power Station	-2.90	-1.65	1.50	-0.59
20	Kansas	Wolf Creek Generating Station	5.49	-3.14	5.39	-1.80
47	Pennsylvania	Beaver Valley Power Station	-2.71	-6.24	-2.36	-3.71
30	Mississippi	Grand Gulf Nuclear Station	4.99	-15.75	1.99	-3.82
26	Michigan	Fermi	5.05	3.76	1.18	-3.85
32	Nebraska	Cooper Nuclear Station	-7.88	-4.26	-1.30	-4.10
46	Ohio	Perry Nuclear Power Plant	10.27	5.49	1.28	-4.98
22	Louisiana	Waterford Steam Electric Station	9.50	7.66	7.39	-6.87
		All 65 plants in operation	15.40	13.90	10.38	6.04
		All 65 plants in operation-outside	23.28	38.41	14.52	8.94

Figure 6. Percent change of the total population living in census tracts within a 10-mile and 50-mile radius, as measured between the census tract centroid point and the nearest NPP, during the periods 1990–2000 and 2000–2010, sorted according to percent change within a 50-mile radius.

4.2 Demographic Characteristic Disparities

4.2.1 Overall Differences in the Demographic Characteristics

In this section, I present my findings pertaining to the overall demographic characteristics of the populations analyzed, sorted into two groups—those within a 50-mile radius of a NPP and those in the outside areas (Table 6). The analyses include 49,215 census tracts in the outside areas across the U.S., and an additional 23,163 census tracts drawn from those areas within a 50-mile radius of a NPP. I utilized the unequal variance Welch t-test. I found that, as compared to the outside areas, the populations living within a 50-mile radius included a higher percent Black (6.86%), percent Asian (0.39%) and percent Color (4.37 %) as of 2010. The difference was statistically significant at the $p<0.001$ level. In contrast, I found that in the outlying areas the populations included higher percent White, percent Native American, percent Other and percent Hispanic. Again, the difference was statistically significant at the $p<0.001$ level. A similar pattern can be observed in data for the years 2000 and 1990, with the lone exception being that percent Asian was higher in the outlying areas in those years. For the past 30 years, from 1990 to 2010, the disparity in percent Black, percent Asian and percent Color between the two areas has continued to widen. In other words, there is an increasing trend to see a greater percent Black, percent Asian and percent Color among the populations living within a 50-mile radius of a NPP.

Table 6

Results of Two Independent-Sample T-tests (Welch's T-test) Calculated to Identify Differences in the Demographic Composition of Populations Living within a 50-Mile Radius of and Populations Living in the Outlying Areas surrounding a U.S.-based NPP as of 2010

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	72378	0.20	49215	75.42	23163	69.32	6.101***	(29.89)
Black	72378	0.18	49215	11.42	23163	18.28	-6.857***	(-38.52)
Asian	72378	0.07	49215	4.38	23163	4.77	-0.391***	(-5.56)
Native American	72378	0.04	49215	1.14	23163	0.36	0.782***	(21.09)
Others	72378	0.08	49215	7.63	23163	7.27	0.365***	(4.57)
Hispanic	72378	0.17	49215	15.21	23163	13.55	1.655***	(9.97)
Color	72378	0.24	49215	33.78	23163	38.15	-4.372***	(-18.13)
White (2000)	72865	0.21	49551	76.59	23314	71.85	4.742***	(23.03)
Black	72865	0.18	49551	10.67	23314	17.30	-6.628***	(-37.52)
Asian	72865	0.06	49551	3.54	23314	3.61	-0.078	(-1.30)
Native American	72865	0.04	49551	1.19	23314	0.42	0.774***	(20.84)
Others	72865	0.09	49551	8.05	23314	6.93	1.129***	(12.94)
Hispanic	72865	0.15	49551	12.29	23314	10.65	1.642***	(10.80)
Color	72865	0.24	49551	29.26	23314	33.28	-4.022***	(-17.06)
White (1990)	72704	0.20	49403	82.23	23301	78.47	3.764***	(19.06)
Black	72704	0.17	49403	9.75	23301	15.68	-5.928***	(-33.88)
Asian	72704	0.05	49403	2.84	23301	2.47	0.376***	(6.91)
Native American	72704	0.04	49403	1.15	23301	0.37	0.777***	(20.72)
Others	72704	0.07	49403	4.04	23301	3.05	0.984***	(14.14)
Hispanic	72704	0.13	49403	8.93	23301	7.55	1.381***	(10.50)
Color	72704	0.22	49403	22.44	23301	25.58	-3.145***	(-14.18)

Mean 1 = the mean percent demographic characteristics in outlying area across the U.S.
Mean 2 = the mean percent demographic characteristics in areas within a 50-mile radius of a NPP
Difference obtained by subtracting Mean 2 from Mean 1; (Mean 1- Mean 2).
t statistics in parentheses
*p<0.05, **p<0.01, ***p<0.001

4.2.2 Differences in Demographic Characteristic at the Individual-NPP Level

In this section, I present my findings pertaining to disparities in the demographic characteristics of the populations in each of the two areas under consideration at the individual-NPP level. The outlying areas surrounding a NPP may encompass areas in a state, or states, other than the state that physically hosts the NPP. The list of states included in this study as outlying areas in relation to an individual NPP is provided in Appendix A (Table A.1). As with previous analyses, I employed an unequal variance Welch's t-test to identify any disparities among the populations in the respective areas.

I estimated individual tests for each of the 65 NPP sites in the U.S.; the findings are presented in Appendix B. In the subsequent paragraphs, I provide a summary of my

statistically significant findings at the individual-NPP level as of 2010 (Tables 7 and 8), 2000 (Appendix A, Tables A. 8 & A.9) and 1990 (Appendix A, Tables A.10 & A.11).

I observed that, above all, there were disparities in the demographic characteristics of populations living near individual NPPs. First, I found statistically significant differences in percent White between the two areas at 53 out of 65 (82%) NPPs, percent Black at 55 NPPs (85%), percent Asian at 48 NPPs (74%), percent Other at 41 NPPs (66%), percent Hispanic at 49 NPPs (75%), and percent Color at 58 NPPs (89%) as of 2010 (Table 7). Similar patterns persisted in the demographic data for individual NPPs in 2000 (Appendix A, Table A. 8) and 1990 (Appendix A, Tables A. 10).

Second, I examined the higher percent values noted for certain demographic characteristics among populations living within a 50-mile radius of a NPP. I observed that there were higher values for percent White at 39 NPPs (60%), percent Black at 27 NPPs (42%), percent Asian at 19 NPPs (29%), percent Native American at 20 NPPs (31%), percent Other at 26 NPPs (40%), percent Hispanic at 25 NPPs (38%) and percent Color at 26 NPPs (40%) as of 2010 (Table 8). I observed similar demographic patterns among the host community populations at individual NPPs in 2000 (Appendix A, Table A. 9) and 1990 (Appendix A, Table A. 11).

Table 7

A Summary of Results for Two Independent-Sample T-tests (Welch's T-test) Calculated to Identify Differences in the Demographic Composition of Populations Living within a 50-mile Radius of and in Outlying Areas surrounding a U.S.-based NPP as of 2010

			2010						
Index	State	Plant	White %	Black %	Asian %	Native %	Others %	Hispanic %	Color %
1	Alabama	Browns Ferry Nuclear Plant							
2	Alabama	Joseph M. Farley Nuclear Plant							
3	Arizona	Palo Verde Nuclear Generating Station							
4	Arkansas	Arkansas Nuclear One							
5	California	Diablo Canyon Nuclear Power Plant							
6	California	San Onofre Nuclear Generating Station							
7	Connecticut	Millstone Power Station							
8	Florida	Crystal River Nuclear Generating Plant							
9	Florida	St. Lucie Plant							
10	Florida	Turkey Point Nuclear Generating							
11	Georgia	Edwin I. Hatch Nuclear Plant							
12	Georgia	Vogtle Electric Generating Plant							
13	Illinois	Braidwood Station							
14	Illinois	Byron Station							
15	Illinois	Clinton Power Station							
16	Illinois	Dresden Nuclear Power Station							
17	Illinois	LaSalle County Station							
18	Illinois	Quad Cities Nuclear Power Station							
19	Iowa	Duane Arnold Energy Center							
20	Kansas	Wolf Creek Generating Station							
21	Louisiana	River Bend Station							
22	Louisiana	Waterford Steam Electric Station							
23	Maryland	Calvert Cliffs Nuclear Power Plant							
24	Massachusetts	Pilgrim Nuclear Power Station							
25	Michigan	Donald C. Cook Nuclear Power Plant							
26	Michigan	Fermi							
27	Michigan	Palisades Nuclear Plant							
28	Minnesota	Monticello Nuclear Generating Plant							
29	Minnesota	Prairie Island Nuclear Generating Plant							
30	Mississippi	Grand Gulf Nuclear Station							
31	Missouri	Callaway Plant							
32	Nebraska	Cooper Nuclear Station							
33	Nebraska	Fort Calhoun Station							
34	New Hampshire	Seabrook Station							
35	New Jersey	Hope Creek Generating Station							
36	New Jersey	Oyster Creek Nuclear Generating Station							
37	New Jersey	Salem Nuclear Generating Station							
38	New York	Indian Point Nuclear Generating							
39	New York	James A. FitzPatrick Nuclear Power Plant							
40	New York	Nine Mile Point Nuclear Station							
41	New York	R.E. Ginna Nuclear Power Plant							
42	North Carolina	Brunswick Steam Electric Plant							
43	North Carolina	McGuire Nuclear Station							
44	North Carolina	Shearon Harris Nuclear Power Plant							
45	Ohio	Davis-Besse Nuclear Power Station							
46	Ohio	Perry Nuclear Power Plant							
47	Pennsylvania	Beaver Valley Power Station							
48	Pennsylvania	Limerick Generating Station							
49	Pennsylvania	Peach Bottom Atomic Power Station							
50	Pennsylvania	Susquehanna Steam Electric Station							
51	Pennsylvania	Three Mile Island Nuclear Station							
52	South Carolina	Catawba Nuclear Station							
53	South Carolina	H. B. Robinson Steam Electric Plant							
54	South Carolina	Oconee Nuclear Station							
55	South Carolina	Virgil C. Summer Nuclear Station							
56	Tennessee	Sequoyah Nuclear Plant							
57	Tennessee	Watts Bar Nuclear Plant							
58	Texas	Comanche Peak Steam Electric Station							
59	Texas	South Texas Project							
60	Vermont	Vermont Yankee Nuclear Power Plant							
61	Virginia	North Anna Power Station							
62	Virginia	Surry Nuclear Power Station							
63	Washington	Columbia Generating Station							
64	Wisconsin	Kewaunee Power Station							
65	Wisconsin	Point Beach Nuclear Plant							
		Total	53	55	48	28	43	49	58
		Percent Total	82%	85%	74%	43%	66%	75%	89%

Note: Red flag represents statistical significance; green flag represents otherwise

Table 8

A Summary of the Differences in the Mean Demographic Composition of Populations Living within a 50-mile Radius of and Populations in Outlying Areas surrounding a U.S.-based NPP as of 2010

			2010						
Index	State	Plant	White %	Black %	Asian %	Native %	Others %	Hispanic %	Color %
1	Alabama	Browns Ferry Nuclear Plant	↑	↓	↓	↑	↑	↑	↓
2	Alabama	Joseph M. Farley Nuclear Plant	↓	↑	↓	↑	↓	↓	↓
3	Arizona	Palo Verde Nuclear Generating Station	↑	↑	↑	↓	↑	↑	↑
4	Arkansas	Arkansas Nuclear One	↑	↓	↓	↑	↓	↑	↓
5	California	Diablo Canyon Nuclear Power Plant	↑	↓	↓	↑	↓	↓	↓
6	California	San Onofre Nuclear Generating Station	↑	↓	↑	↓	↓	↓	↓
7	Connecticut	Millstone Power Station	↑	↓	↓	↓	↓	↓	↓
8	Florida	Crystal River Nuclear Generating Plant	↑	↓	↓	↓	↓	↓	↓
9	Florida	St. Lucie Plant	↓	↑	↓	↑	↓	↓	↓
10	Florida	Turkey Point Nuclear Generating	↓	↑	↓	↓	↑	↑	↑
11	Georgia	Edwin I. Hatch Nuclear Plant	↑	↓	↓	↓	↑	↓	↓
12	Georgia	Vogtle Electric Generating Plant	↑	↓	↓	↓	↑	↓	↓
13	Illinois	Braidwood Station	↑	↓	↓	↓	↓	↓	↓
14	Illinois	Byron Station	↑	↓	↓	↓	↓	↓	↓
15	Illinois	Clinton Power Station	↑	↓	↓	↓	↓	↓	↓
16	Illinois	Dresden Nuclear Power Station	↓	↑	↓	↓	↑	↑	↑
17	Illinois	LaSalle County Station	↑	↓	↓	↓	↑	↑	↓
18	Illinois	Quad Cities Nuclear Power Station	↑	↓	↓	↑	↓	↓	↓
19	Iowa	Duane Arnold Energy Center	↓	↑	↑	↓	↓	↓	↑
20	Kansas	Wolf Creek Generating Station	↑	↓	↓	↓	↓	↓	↓
21	Louisiana	River Bend Station	↓	↑	↑	↓	↓	↓	↑
22	Louisiana	Waterford Steam Electric Station	↓	↑	↓	↓	↑	↑	↑
23	Maryland	Calvert Cliffs Nuclear Power Plant	↓	↑	↓	↓	↓	↓	↑
24	Massachusetts	Pilgrim Nuclear Power Station	↓	↑	↑	↑	↓	↓	↑
25	Michigan	Donald C. Cook Nuclear Power Plant	↑	↓	↓	↓	↑	↑	↓
26	Michigan	Fermi	↓	↑	↑	↓	↑	↑	↑
27	Michigan	Palisades Nuclear Plant	↑	↓	↓	↓	↑	↑	↓
28	Minnesota	Monticello Nuclear Generating Plant	↓	↑	↑	↓	↑	↑	↑
29	Minnesota	Prairie Island Nuclear Generating Plant	↓	↑	↑	↓	↑	↑	↑
30	Mississippi	Grand Gulf Nuclear Station	↓	↑	↓	↓	↓	↓	↑
31	Missouri	Callaway Plant	↑	↓	↑	↓	↓	↓	↓
32	Nebraska	Cooper Nuclear Station	↑	↓	↑	↓	↓	↓	↓
33	Nebraska	Fort Calhoun Station	↓	↑	↓	↓	↑	↑	↑
34	New Hampshire	Seabrook Station	↓	↑	↑	↓	↑	↑	↑
35	New Jersey	Hope Creek Generating Station	↓	↑	↓	↑	↑	↓	↑
36	New Jersey	Oyster Creek Nuclear Generating Station	↑	↓	↑	↓	↓	↓	↓
37	New Jersey	Salem Nuclear Generating Station	↓	↑	↓	↑	↑	↓	↑
38	New York	Indian Point Nuclear Generating	↓	↑	↑	↓	↑	↑	↑
39	New York	James A. FitzPatrick Nuclear Power Plant	↑	↓	↓	↑	↓	↓	↓
40	New York	Nine Mile Point Nuclear Station	↑	↓	↓	↑	↓	↓	↓
41	New York	R.E. Ginna Nuclear Power Plant	↑	↓	↓	↓	↓	↓	↓
42	North Carolina	Brunswick Steam Electric Plant	↑	↓	↓	↑	↓	↑	↓
43	North Carolina	McGuire Nuclear Station	↑	↓	↑	↓	↑	↑	↓
44	North Carolina	Shearon Harris Nuclear Power Plant	↓	↑	↑	↓	↑	↑	↑
45	Ohio	Davis-Besse Nuclear Power Station	↑	↓	↓	↓	↑	↑	↓
46	Ohio	Perry Nuclear Power Plant	↓	↑	↓	↑	↓	↓	↑
47	Pennsylvania	Beaver Valley Power Station	↑	↓	↓	↓	↓	↓	↓
48	Pennsylvania	Limerick Generating Station	↓	↑	↓	↓	↓	↓	↑
49	Pennsylvania	Peach Bottom Atomic Power Station	↓	↑	↓	↓	↑	↑	↑
50	Pennsylvania	Susquehanna Steam Electric Station	↑	↓	↓	↓	↓	↓	↓
51	Pennsylvania	Three Mile Island Nuclear Station	↑	↓	↓	↓	↓	↑	↓
52	South Carolina	Catawba Nuclear Station	↑	↓	↑	↓	↑	↑	↑
53	South Carolina	H. B. Robinson Steam Electric Plant	↓	↑	↓	↓	↓	↓	↑
54	South Carolina	Oconee Nuclear Station	↑	↓	↓	↓	↓	↓	↓
55	South Carolina	Virgil C. Summer Nuclear Station	↓	↑	↑	↓	↓	↓	↑
56	Tennessee	Sequoyah Nuclear Plant	↑	↓	↓	↑	↑	↑	↓
57	Tennessee	Watts Bar Nuclear Plant	↑	↓	↓	↑	↓	↓	↓
58	Texas	Comanche Peak Steam Electric Station	↑	↓	↓	↑	↓	↓	↓
59	Texas	South Texas Project	↑	↓	↓	↓	↓	↓	↓
60	Vermont	Vermont Yankee Nuclear Power Plant	↑	↓	↓	↑	↑	↑	↓
61	Virginia	North Anna Power Station	↑	↑	↓	↑	↓	↓	↓
62	Virginia	Surry Nuclear Power Station	↓	↑	↓	↓	↓	↓	↑
63	Washington	Columbia Generating Station	↓	↓	↓	↓	↑	↑	↑
64	Wisconsin	Kewaunee Power Station	↑	↓	↑	↑	↓	↓	↓
65	Wisconsin	Point Beach Nuclear Plant	↑	↓	↑	↑	↓	↓	↓
		Total	39	27	19	20	26	25	26
		Percent Total	60%	42%	29%	31%	40%	38%	40%

Note: Green Arrow represents demographic percent composition greater than in outlying areas; Red arrow indicates otherwise

4.3 Implications for Environmental Justice

First, 8% (300,801 square miles) of the total land area of the U.S. (3.80 million square miles) is occupied by host communities located within a 50-mile radius of a NPP. This means that the area that could be affected by NPPs and any accidents that might occur at them is objectively large. Even the definition of a 50-mile radius as the extent of the area that would be impacted remains open to debate given the new data still being generated and analyzed in the aftermath of the most recent core meltdown-type accident, at Fukushima NPP. In addition to this large potentially impacted area, my findings also reveal that 96 million people out of a total population of 304 million live in host communities. This segment of the population is significantly larger than the estimated 22 million people who lived within three miles of a toxic release inventory (TRI) facility in the U.S. (Bullard, Mohai, Saha, & Wright, 2007b). The largest group of host communities—those within a 50-mile radius of Indian Point Nuclear Power Plant in New York—is home to approximately 15 million out of the 96 million people who live in such proximity to a U.S.-based NPP. The host communities include among their populations a lower percent White and a higher percent Black, Asian and Color than compared to other communities. The disparities in the demographic characteristics that exist between host and non-host communities are statistically significant. This large population size and the disparities in the demographic characteristics imply that particular racial minority groups are disproportionately shouldering the environmental hazards and risks that come attached to nuclear power. In addition, the large population living in host communities presents challenges in terms of disaster management, including in devising efficient and effective rescue and mitigation plans. The NRC emergency planning and preparation

process appears not to take into account the sheer size of the potentially impacted population in its existing emergency evacuation, sheltering, and other action plans (US NRC, 2011a). There is no detailed evacuation plan available for the host communities, especially in the most densely populated areas surrounding the Indian Point NPP. It is not an easy or simple task to evacuate or shelter some 15 million people. When people are gripped by panic, traffic congestion would be inevitable. According to the notion of environmental justice as defined by the EPA, from a protection perceptive, environmental justice is achieved when everyone enjoys the same degree of protection from environmental and health hazards. Bottom line, these descriptive statistics imply that there is no equal protection from the potential risks associated with commercial NPPs.

4.4 Summary of Findings

At the national level, host communities within a 50-mile radius of a NPP account for:

- 8% of the total land area in the country;
- Over 30% of the total U.S. population;
- A lower percent White than in non-host communities;
- A higher percent Black, Asian and Color ;
- A higher percent of people living renter-occupied housing units;
- A higher percent of native-born citizens;
- A higher unemployment rate;
- A lower percent of people living below the federal poverty line; and,
- A higher mean household income.

At the regional level, the host communities register:

- Their highest percent White in the Northeast region;
- Their highest percent Black in the South;
- Their highest percent Asian, Other, Hispanic, and Color in the West;
- Their lowest percent of native-born citizens in the West;
- Their highest percent of people living in renter-occupied housing units, people with college degrees or higher, and the highest unemployment in the West; and,
- Their highest percent of people living beneath the federal poverty line in the South.

At the different distance-based categories considered in this analysis, the host communities included:

- About 4%, 14%, 26%, 36%, and 21%, respectively, of the 96 million people living in a host community were living within either a 0–10 mile radius of a NPP, 11–20 miles, 21–30 miles, 31–40 miles, or 41–50 miles;
- A higher percent Hispanic and percent Native American can be found living within a 31–50-mile radius of NPPs;
- Percent White decreased with distance from a NPP;
- Percent Black, percent Asian, percent Other, percent Hispanic and percent Color increase with distance from a NPP;
- Percent living below the federal poverty line increases with distance from a NPP;
- Percent unemployed increases with distance from a NPP; and
- Percent living in renter-occupied housing units increases with distance from a NPP.

The changes in the demographic characteristics registered over the last three decades and as sorted by distance-based categories are as follows:

- Percent White declined both from 1990–2000 and 2000–2010 in all distance categories;
- Percent Black, percent Asian, percent Color, percent Hispanic and percent Other increased in both periods and across all distance categories; and,
- Percent native-born citizens declined in both periods and across all distance categories.

At the individual-NPP level, the host communities contained:

- In the broader vicinity (0–50 miles), anywhere from 15 million (Indian Point NPP, New York) to just 0.11 million people (Cooper Nuclear Station, Nebraska);
- In the immediate vicinity (0–10 miles), anywhere from 0.26 million people (Limerick Generating Station, Pennsylvania) to just 2,654 people (South Texas Project, Texas).

Chapter 5

FINDINGS TO RESEARCH QUESTION 2

This chapter presents my findings pertaining to Research Question 2: Among communities within a 50-mile radius of an NPP, is there any statistical association between the communities' distance from a NPP and their socio-demographic characteristics? The overall aim of this chapter is to arrive at an understanding of the statistical associations that exist, if any, between the dependent variable—distance from a NPP—and the racial and ethnic characteristics of the populations living in host communities that are within a 50-mile radius of a U.S.-based commercial NPP. To achieve this goal, I have followed three steps in conducting an OLS (multivariate regression) analysis, described below. The OLS regression estimates first were generated at the national, regional and individual plant levels. In addition, because the locations of the 65 U.S.-based commercial NPPs are scattered across the nation, OLS and spatial autocorrelation regression (SAR) analyses were conducted at individual NPP sites in order to account for any differences in geography.

First, I summarized the descriptive statistics of the dataset to identify any abnormalities that might be present in each study variable. Second, I estimated the correlation coefficients between the dependent variable and each independent variable to identify any statistical associations that might exist between the dependent variable and each independent variable. Third, to identify any statistical associations between the dependent variable and the independent variables, I conducted multivariate regression analyses. Their level of statistical significance with the dependent variable—distance—was tested at the $p<0.1$, $p<0.05$, $p<0.01$ and $p<0.001$ levels. The Akaike information

criterion (AIC) was employed to indicate the overall level of fit of the resulting models; the lower the AIC value, the better the model's fit.

The findings are presented as follows: First, I present the results of the OLS regression for the aggregated data at the national level. Second, I discuss the results of OLS regressions performed on regional-level data for the U.S. West, Midwest, Northeast and South. Third, I discuss the results of the multivariate regression analyses, which were performed at the urban/metro-area level and for the corresponding non-urban areas. Fourth, I present the results of the OLS regression analyses conducted at the individual-NPP level. Fifth, I discuss the results of SAR analyses performed for each of the 65 NPP sites. Finally, I summarize my findings.

5.1 OLS regression of national level study variables

Environmental justice could be said to have been achieved when all people, regardless of race, color, national origin, income or socio-economic status, enjoy the same degree of protection from environmental and health hazards (US EPA, 2013). With that definition in mind, the main purpose of this section is to explore the relationship between the socio-economic status of the peoples living in host communities and distance from a NPP. In other words, this section examines the environmental justice of host communities by looking into their exposure to potential risks of the sort associated with NPPs and attempting to identify any differences in the extent or severity of said exposure that occur on the bases of socio-economic status, ethnicity or race. In order to relate the distribution of potential risks that result from the proximate presence of a NPP and the socio-economic status of those living in its host communities, I performed a multivariate

regression analysis. The relationships between the dependent variable—distance from a NPP—and a number of socio-economic variables are tested in four regression models. Among the four models, the first and third models examine the relationship between distance and variables that describe race. The first model includes the variables percent Color and natural log of population density (LN), while the third model considers different racial groups—namely, percent Black, percent Asian, and percent Hispanic—as well as population density (LN). I use population density (LN) as a variable because it is a good proxy for economic activity and poverty (Pastor et al., 2005; Ash & Fetter, 2004b). The second and fourth models test the relationship between distance and a range of racial and socio-economic variables, including percent population living below the federal poverty line and percent living in owner-occupied housing units.

First, the multivariate regression analyses performed for each of the four models at the overall level considered a dataset that included information on the dependent and independent variables for the 27,470 census tracts that include a host community associated with one of the 65 U.S.-based commercial NPPs (Table 9). Among the independent variables, I observed that the natural logarithm (LN) population density was strongly correlated with distance from the NPP; percent Color and percent Asian also exhibited strong correlations with distance (Table 10). This can be interpreted to mean that NPPs mostly are located in areas with a low population density.

In models 1 and 3, each of the racial/ethnic independent variables—percent Black, percent Asian, percent Hispanic and percent Color—exhibited a statistically significant association with distance, in miles, from a NPP (LN) (Table 11)—in other words, the greater the distance from a NPP, the higher the percent Color, percent Black,

percent Asian, and percent Hispanic living in the host communities. In addition, in models 2 and 4, each of the four racial/ethnic variables, as well as certain socio-economic variables—namely, percent living below the federal poverty line and percent living in owner-occupied housing—showed a significant association with distance (LN), implying that NPPs are located in or near communities with a low socio-economic status, where more poor people live in their own housing units. Population density (LN) exhibited a significant statistical relationship with distance (LN), such that the greater the distance from a NPP, the higher the population density; said otherwise, this means that NPPs are located in areas with a low population density. The explanatory power of each of the four models was evaluated using the AIC. I found that the AIC values decreased as socio-economic variables were added to the models, indicating that said variables improve the models' fit to the data.

Table 9
Descriptive Statistics for Study Variables at the National Level

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.405	0.465	0.242	3.912
Black (%)	17.731	26.336	0.000	100.000
Asian (%)	4.588	8.288	0.000	100.000
Hispanic (%)	13.640	19.710	0.000	100.000
Color (%)	37.529	31.849	0.000	100.000
Population Density (LN)	7.601	2.012	0.000	12.317
Below Poverty Line (%)	13.933	12.807	0.000	100.000
Owner-Occupied Housing Units (%)	57.833	24.605	0.000	100.000
Observations	27470			

Table 10
Pearson Correlation Coefficients between Distance (LN) and Independent Variables

	rho	p	count
Black (%)	0.0759	0.0000	27470
Asian (%)	0.1518	0.0000	27470
Hispanic (%)	0.1230	0.0000	27470
Color (%)	0.1795	0.0000	27470
Population Density (LN)	0.1946	0.0000	27470
Below Poverty Line (%)	0.0616	0.0000	27470
Owner-Occupied Housing Units (%)	-0.1078	0.0000	27470
Observations	27470		

Table 11
Results of the Multivariate Regression (Ordinary Least Square) Analysis between Distance (LN) and Independent Variables at the National Level

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0013***	0.0014***
			(11.303)	(10.692)
Asian (%)			0.0070***	0.0067***
			(19.473)	(18.763)
Hispanic (%)			0.0018***	0.0018***
			(11.841)	(11.222)
Color (%)	0.0016***	0.0018***		
	(15.520)	(15.470)		
Population Density (LN) (%)	0.0321***	0.0309***	0.0254***	0.0250***
	(20.079)	(19.259)	(15.372)	(15.081)
Below Poverty Line (%)		-0.0024***		-0.0014***
		(-8.502)		(-4.869)
Owner-Occupied Housing Units (%)		-0.0008***		-0.0007***
		(-5.599)		(-4.606)
Constant	3.1025***	3.1833***	3.1327***	3.1934***
	(281.890)	(190.970)	(280.587)	(192.116)
Observations	27470	27470	27470	27470
R-squared	0.046	0.049	0.055	0.056
F	665.7803	352.6905	400.7073	272.5005
Log-likelihood	-17292.4758	-17254.7050	-17163.6491	-17148.3988
Akaike Info Coefficient	34590.9515	34519.4100	34337.2982	34310.7976

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

5.2 OLS regression of regional level study variables

The relationship between the dependent and independent variables can vary with the data available for different geographical regions (McLeod et al., 2000). In this section, I investigate whether there are regional variations in the distribution of certain socio-economic variables among the host communities' populations. The four multivariate models were used to examine the relationship between distance in miles (LN) from a NPP and the aforementioned socio-economic variables. The sample sizes were 2,299, 6,715, 10,566 and 7,890 census tracts, respectively, for the U.S. West, Midwest, Northeast and South, respectively (Tables 12, 15, 18, and 21). In the West, percent Color and percent Black exhibited a strong correlation with distance from a NPP (LN) (Table 13). In other words, the greater the distance between the host community and the NPP, the higher the percent Black composition of the host community. In the

Midwest, percent Color and percent Hispanic exhibited a strong association with distance (Table 16), whereas in the Northeast, percent Color and percent Asian were most strongly correlated with distance (Table 19). In the South, percent Color and percent Black exhibited the strongest statistical association with distance (Table 22).

All of the independent variables in models 1, 2, 3 and 4—both the racial/ethnic variables as well as the socio-economic variables—exhibited a statistically significant association with the dependent variable, distance (LN), in the U.S. Midwest and Northeast regions (Tables 17 and 20). In the West region, all of the independent variables in all models—excepting percent living below the federal poverty line and percent living in owner-occupied housing units in models 2 and 3—exhibited a significant relationship with distance (LN) (Table 14). Similarly, in the South, all of the independent variables in all models, as well as percent Hispanic, percent living below the federal poverty line and percent living in owner-occupied housing units in models 2, 3 and 4, exhibited a significant association with distance (LN) (Table 23). These findings indicate that the direction and statistical significance of the relationship between distance and the socio-economic variables under consideration do not change with different regional datasets. The lone exception to this is a negative relationship that was identified between distance and percent Hispanic in the South region (NPPs in the South are located in communities that include a higher percent Hispanic among their population).

Table 12

Descriptive Statistics for Study Variables in the U.S. West Region

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.554	0.365	0.923	3.912
Black (%)	4.443	5.869	0.000	56.189
Asian (%)	10.222	12.785	0.000	79.316
Hispanic (%)	34.726	24.879	0.000	99.678
Color (%)	51.963	26.294	0.000	100.000
Population Density (LN)	8.168	1.542	0.000	10.791
Below Poverty Line (%)	12.865	11.598	0.000	100.000
Owner-Occupied Housing Units (%)	57.599	22.912	0.000	100.000
Observations	2299			

Table 13

Pearson Correlation Coefficients between Distance (LN) and Independent Variables in the U.S. West Region

	rho	p	count
Black (%)	0.2375	0.0000	2299
Asian (%)	0.1170	0.0000	2299
Hispanic (%)	0.2098	0.0000	2299
Color (%)	0.3092	0.0000	2299
Population Density (LN)	0.1942	0.0000	2299
Below Poverty Line (%)	0.1296	0.0000	2299
Owner-Occupied Housing Units (%)	-0.0918	0.0000	2299
Observations	2299		

Table 14

Results of the Multivariate Regression (Ordinary Least Square) Analysis between Distance (LN) and Independent Variables in the U.S. West Region

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0126***	0.0128***
			(10.196)	(10.115)
Asian (%)			0.0044***	0.0044***
			(7.261)	(7.218)
Hispanic (%)			0.0028***	0.0029***
			(8.764)	(7.961)
Color (%)	0.0038***	0.0040***		
	(12.864)	(11.914)		
Population Density (LN)	0.0211***	0.0208***	0.0196***	0.0197***
	(4.166)	(4.089)	(3.862)	(3.866)
Below Poverty Line (%)		-0.0011		-0.0005
		(-1.334)		(-0.551)
Owner-Occupied Housing Units (%)		-0.0002		0.0000
		(-0.467)		(0.104)
Constant	3.1833***	3.2000***	3.1966***	3.1950***
	(81.840)	(65.222)	(82.831)	(65.433)
Observations	2299	2299	2299	2299
R-squared	0.102	0.103	0.122	0.122
F	130.9836	65.9440	79.7006	53.1772
Log-likelihood	-820.6551	-819.7392	-795.2718	-795.0346
Akaike Info Coefficient	1647.3101	1649.4784	1600.5435	1604.0691

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 15

Descriptive Statistics for Study Variables in the U.S. Midwest Region

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.435	0.426	0.166	3.912
Black (%)	18.439	29.967	0.000	100.000
Asian (%)	3.087	5.714	0.000	85.280
Hispanic (%)	8.979	16.051	0.000	100.000
Color (%)	32.310	32.002	0.000	100.000
Population Density (LN)	7.419	1.861	0.000	11.319
Below Poverty Line (%)	15.115	14.011	0.000	89.320
Owner-Occupied Housing Units (%)	61.657	23.039	0.000	100.000
Observations	6715			

Table 16

Pearson Correlation Coefficients between Distance (LN) and Independent Variables in the U.S. Midwest Region

	rho	p	count
Black (%)	0.1171	0.0000	6715
Asian (%)	0.1186	0.0000	6715
Hispanic (%)	0.1263	0.0000	6715
Color (%)	0.1896	0.0000	6715
Population Density (LN)	0.2080	0.0000	6715
Below Poverty (%)	0.0759	0.0000	6715
Owner Occupied Units (%)	-0.1075	0.0000	6715
Observations	6715		

Table 17

Results of the Multivariate Regression (Ordinary Least Square) Analysis between Distance (LN) and Independent Variables in the U.S. Midwest Region

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0014***	0.0018***
			(7.426)	(7.757)
Asian (%)			0.0079***	0.0078***
			(8.483)	(8.269)
Hispanic (%)			0.0027***	0.0029***
			(7.765)	(7.986)
Color (%)	0.0015***	0.0020***		
	(7.921)	(8.451)		
Population Density (LN)	0.0343***	0.0343***	0.0275***	0.0283***
	(10.707)	(10.732)	(8.408)	(8.656)
Below Poverty Line (%)		-0.0032***		-0.0026***
		(-5.787)		(-4.607)
Owner-Occupied Housing Units (%)		-0.0010**		-0.0008*
		(-3.188)		(-2.486)
Constant	3.1329***	3.2288***	3.1564***	3.2295***
	(143.572)	(95.699)	(144.067)	(96.049)
Observations	6715	6715	6715	6715
R-squared	0.052	0.057	0.062	0.065
F	184.6294	101.1216	110.7839	77.6059
Log-likelihood	-3623.7810	-3607.0627	-3588.8726	-3578.2634
Akaike Info Coefficient	7253.5621	7224.1255	7187.7453	7170.5269

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 18

Descriptive Statistics for Study Variables in the U.S. Northeast Region

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.402	0.470	0.242	3.912
Black (%)	14.688	23.885	0.000	100.000
Asian (%)	5.897	9.799	0.000	100.000
Hispanic (%)	13.531	18.472	0.000	100.000
Color (%)	35.328	32.879	0.000	100.000
Population Density (LN)	8.156	2.027	0.000	12.317
Below Poverty Line (%)	12.816	12.690	0.000	100.000
Owner-Occupied Housing Units (%)	55.322	27.069	0.000	100.000
Observations	10566			

Table 19

Pearson Correlation Coefficients between Distance (LN) and Independent Variables in the U.S. Northeast Region

	rho	p	count
Black (%)	0.1275	0.0000	10566
Asian (%)	0.1849	0.0000	10566
Hispanic (%)	0.1433	0.0000	10566
Color (%)	0.2281	0.0000	10566
Population Density (LN)	0.2544	0.0000	10566
Below Poverty Line (%)	0.0829	0.0000	10566
Owner-Occupied Housing Units (%)	-0.1652	0.0000	10566
Observations	10566		

Table 20

Results of the Multivariate Regression (Ordinary Least Square) Analysis between Distance (LN) and Independent Variables in the U.S. Northeast Region

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0015***	0.0017***
			(7.160)	(7.712)
Asian (%)			0.0068***	0.0063***
			(13.767)	(12.646)
Hispanic (%)			0.0012***	0.0013***
			(4.365)	(4.154)
Color (%)	0.0016***	0.0019***		
	(9.103)	(9.568)		
Population Density (LN)	0.0425***	0.0427***	0.0367***	0.0374***
	(15.077)	(15.097)	(12.802)	(12.960)
Below Poverty Line (%)		-0.0048***		-0.0039***
		(-10.060)		(-7.881)
Owner-Occupied Housing Units (%)		-0.0016***		-0.0015***
		(-6.885)		(-6.521)
Constant	2.9995***	3.1351***	3.0249***	3.1501***
	(148.838)	(112.739)	(148.942)	(113.369)
Observations	10566	10566	10566	10566
R-squared	0.072	0.081	0.083	0.089
F	409.7505	233.7125	238.4673	172.1692
Log-likelihood	-6610.0491	-6556.6999	-6547.9667	-6511.6897
Akaike Info Coefficient	13226.0982	13123.3998	13105.9335	13037.3793

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 21

Descriptive Statistics for Study Variables in the U.S. South Region

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.339	0.502	0.008	3.912
Black (%)	25.077	27.541	0.000	100.000
Asian (%)	2.471	4.156	0.000	66.365
Hispanic (%)	11.608	18.545	0.000	100.000
Color (%)	40.714	30.177	0.000	100.000
Population Density (LN)	6.847	1.963	0.000	11.075
Below Poverty Line (%)	14.733	12.055	0.000	100.000
Owner-Occupied Housing Units (%)	58.009	22.386	0.000	100.000
Observations	7890			

Table 22

Pearson Correlation Coefficients between Distance (LN) and Independent Variables in the U.S. South Region

	rho	p	count
Black (%)	0.0675	0.0000	7890
Asian (%)	0.0723	0.0000	7890
Hispanic (%)	0.0040	0.7212	7890
Color (%)	0.0781	0.0000	7890
Population Density (LN)	0.0706	0.0000	7890
Below Poverty Line (%)	0.0222	0.0483	7890
Owner-Occupied Housing Units (%)	-0.0396	0.0004	7890
Observations	7890		

Table 23

Results of the Multivariate Regression (Ordinary Least Square) Analysis between Distance (LN) and Independent Variables in the U.S. South Region

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0012***	0.0012***
			(5.337)	(4.602)
Asian (%)			0.0085***	0.0083***
			(5.882)	(5.719)
Hispanic (%)			0.0000	-0.0000
			(0.112)	(-0.000)
Color (%)	0.0010***	0.0010***		
	(4.451)	(4.076)		
Population Density (LN)	0.0109***	0.0103**	0.0084*	0.0083*
	(3.302)	(3.096)	(2.431)	(2.381)
Below Poverty Line (%)		-0.0008		-0.0004
		(-1.363)		(-0.696)
Owner-Occupied Housing Units (%)		-0.0004		-0.0004
		(-1.479)		(-1.288)
Constant	3.2257***	3.2657***	3.2295***	3.2606***
	(156.701)	(102.340)	(154.593)	(102.207)
Observations	7890	7890	7890	7890
R-squared	0.007	0.008	0.012	0.012
F	29.7168	15.5733	23.7438	16.1097
Log-likelihood	-5733.9514	-5732.5241	-5716.3343	-5715.4901
Akaike Info Coefficient	11473.9028	11475.0483	11442.6687	11444.9803

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

5.3 OLS regression of hosting community study variables at individual NPPs

After I had determined the extent of variation between the different regions of the U.S., I next examined local variation. Because different geographical datasets may have provided a different picture of the relationship between the dependent variable, distance (LN), and the various ethnic/racial and socioeconomic variables under consideration (McLeod et al., 2000), I tested their association with the study variables at individual NPPs.

In addition to locally significant variables, it was important that I be able to detect any spatial autocorrelation problems with any of the four proposed models. One important assumption in an OLS regression is that the residuals (error term) in the regression analysis equation are randomly distributed. When this assumption is violated, there exist spatial autocorrelation problems that are associated with the model's specification. Spatial autocorrelation problems can most often be traced back to autocorrelation among spatially located error terms, or autocorrelation among independent study variables that are spatially lagged. Therefore, I examined possible spatial autocorrelation problems in the OLS regression analyses. Anselin (2005) suggested that Moran's I statistic is a great indicator for this, as it not only detects the error in the model's specification but also suggests a model that is more appropriate to the input data. To obtain a Moran's I statistic, a spatial weight matrix has to be included in the OLS. That spatial weight matrix is obtained through the use of queen-based contiguity, which "determines neighboring units as those that have any point in common, including both common boundaries and common corners" (Anselin, 2005, p.112). When an OLS regression is conducted with a spatial weight matrix using the GeoDa program,

the results provide six test statistics able to determine spatial autocorrelation problems and suggest alternative model specifications that will correct identified problems. The six test statistics include Moran's I statistic and five Lagrange Multiplier (LM) statistics. When Moran's I is significant, it suggests a potential spatial autocorrelation problem. Otherwise, the OLS regression results are considered final. If the Moran's I value was found to be significant, I then checked each of the five LM statistics to determine which model might offer a better fit to the data. The statistics provided were LM-Lag and Robust LM-Lag, LM-Error and Robust LM-Error test, and LM-SARMA, which applies to models with both spatial lag and spatial error terms and is often a sign that the model is not useful (Anselin, 2005).

There are several steps involved in detecting a spatial autocorrelation problem (Anselin, 2005). The first step is to check whether either of the LM diagnostic statistics—LM-Error or LM-Lag—is significant. The OLS regression results can be retained if both are insignificant but, if either proves to be significant, the next step is to compute either a LM-Error or LM-Lag model. Second, when both the LM-Error and LM-Lag statistics are significant, Robust LM-Error and Robust LM-lag must be examined; if either proves to be significant, the next step is again to run either a LM-Error or LM-Lag model.

I conducted multivariate regression analyses of the data for 54 individual NPPs, using a spatial-weight matrix informed by queen-based contiguity; I conducted multivariate regression analyses for the remaining 11 in five clusters due to the close physical proximity certain NPPs had to one another. The five location clusters were as follows: Cluster 1: (1) Braidwood Station, Illinois, (2) Dresden Nuclear Power Station, Illinois, and (3) LaSalle County Station, Illinois; Cluster 2: (1) Donald C. Cook Nuclear

Power Plant, Michigan, and (2) Palisades Nuclear Plant, Michigan; Cluster 3: (1) Hope Creek Generating Station, New Jersey, and (2) Salem Nuclear Generating Station, New Jersey; Cluster 4: (1) James A. Fitzpatrick Nuclear Power Plant, New York, and (2) Nine Mile Point Nuclear Station, New York; and, Cluster 5: (1) Kewaunee Power Station, Wisconsin, and (2) Point Beach Nuclear Plant, Wisconsin. The results of the multivariate regression analyses for each of the 59 locations are provided in Appendix C, and include a map showing the location of each NPP as well as four tables that show: (1) descriptive statistics, (2) Pearson correlation analyses, (3) multivariate regression (OLS) analyses, and (4) spatial autocorrelation regression (SAR) analyses. I summarize the results for the OLS analyses for each of the four models (Tables 24, 25, 26, and 27). Each summary table includes information on the statistical significance of the associations given the number of observations and Moran's I statistics for the 54 individual NPPs as well as for the 11 NPPs treated in five clusters.

The sample sizes for the 59 locations ranged from 43 to 4,068 census tracts and can be broken down as follows: 8 (14%) NPPs drew on datasets that included fewer than 100 census tracts; 12 (20%) datasets included 101–200 census tracts; 17 (29%) included 201–400 census tracts; 17 (29%) included 401–1,000 census tracts and 5 (8%) included 1001 or more census tracts.

In model 1, percent Color exhibited a statistically significant relationship with distance (LN) at 31 of 59 (53%) locations, whereas population density (LN) exhibited a strong statistical association with distance at 38 (64%) locations (Table 24). In model 2, I observed statistically significant associations of percent Color at 31 (53%) locations, population density (LN) at 40 (68%), percent living below the federal poverty line at 25

(42%) and percent living in owner-occupied housing units at 25 (42%) (Table 25). I found that the Moran's I values for both model 1 and model 2 were high and diverged to a statistically significant degree from zero, indicating that the residual errors of the OLS analyses are dependent upon one another. This finding violates a basic assumption of OLS analyses and suggests the need to take into account spatial autocorrelation by subjecting the data to SAR analyses.

The OLS results estimated by model 3 reveal percent Black to have a statistically significant association with distance (LN) at 22 (37%) locations, percent Asian at 19 (32%), percent Hispanic at 28 (47%) and population density (LN) at 39 (66%) (Table 26). Overall, there was a statistically significant relationship between distance (LN) and at least one racial/ethnic variable at 39 (66%) locations, and between distance (LN) and at least one socio-economic variable at 39 (66%) locations. When model 3 was run using the same socio-economic variables as were used in model 4, the results revealed statistically significant associations between distance and percent Black at 33 (56%) locations, percent Asian at 19 (32%), percent Hispanic at 31 (53%), population density (LN) at 40 (68%), percent living below the federal poverty line at 26 (44%) and percent living in owner-occupied housing units at 19 (32%) (Table 27). Overall, the results indicate a statistically significant association with distance of at least one racial/ethnic variable at 44 (75%) locations and at least one socio-economic variable at 49 (83%). Similar to models 1 and 2, the Moran's I values for models 3 and 4 are high and significantly different from zero.

Table 24

Summary of Results of the Multivariate Regression (Ordinary Least Square) Analyses between Distance (LN) and Independent Variables at Individual NPPs in Model 1

			Model 1 (OLS)			
Index	State	Plant	Color %	Pop. Den. (LN)	N	Moran's I
1	Alabama	Browns Ferry Nuclear Plant			223	0.8841***
2	Alabama	Joseph M. Farley Nuclear Plant			110	0.7855***
3	Arizona	Palo Verde Nuclear Generating Station			534	0.7615***
4	Arkansas	Arkansas Nuclear One			72	0.8363***
5	California	Diablo Canyon Nuclear Power Plant			92	0.5845***
6	California	San Onofre Nuclear Generating Station			1588	0.9330***
7	Connecticut	Millstone Power Station			642	0.9262***
8	Florida	Crystal River Nuclear Generating Plant			225	0.8454***
9	Florida	St. Lucie Plant			268	0.9251***
10	Florida	Turkey Point Nuclear Generating			691	0.9125***
11	Georgia	Edwin I. Hatch Nuclear Plant			88	0.6976***
12	Georgia	Vogtle Electric Generating Plant			152	0.7400***
13	Illinois	Braidwood Station			1668	0.8539***
14	Illinois	Byron Station			201	0.8299***
15	Illinois	Clinton Power Station			207	0.8311***
16	Illinois	Dresden Nuclear Power Station				
17	Illinois	LaSalle County Station				
18	Illinois	Quad Cities Nuclear Power Station			150	0.8146***
19	Iowa	Duane Arnold Energy Center			156	0.8950***
20	Kansas	Wolf Creek Generating Station			50	0.5661***
21	Louisiana	River Bend Station			164	0.7932***
22	Louisiana	Waterford Steam Electric Station			247	0.8916***
23	Maryland	Calvert Cliffs Nuclear Power Plant			786	0.8347***
24	Massachusetts	Pilgrim Nuclear Power Station			616	0.8772***
25	Michigan	Donald C. Cook Nuclear Power Plant			430	0.8844***
26	Michigan	Fermi			1312	0.9621***
27	Michigan	Palisades Nuclear Plant				
28	Minnesota	Monticello Nuclear Generating Plant			456	0.8701***
29	Minnesota	Prairie Island Nuclear Generating Plant			448	0.8321***
30	Mississippi	Grand Gulf Nuclear Station			89	0.5851***
31	Missouri	Callaway Plant			113	0.7585***
32	Nebraska	Cooper Nuclear Station			43	0.4953***
33	Nebraska	Fort Calhoun Station			282	0.8115***
34	New Hampshire	Seabrook Station			828	0.9127***
35	New Jersey	Hope Creek Generating Station			418	0.8773***
36	New Jersey	Oyster Creek Nuclear Generating Station			602	0.9066***
37	New Jersey	Salem Nuclear Generating Station				
38	New York	Indian Point Nuclear Generating			4068	0.9492***
39	New York	James A. FitzPatrick Nuclear Power Plant			231	0.8996***
40	New York	Nine Mile Point Nuclear Station				
41	New York	R.E. Ginna Nuclear Power Plant			281	0.8560***
42	North Carolina	Brunswick Steam Electric Plant			129	0.8163***
43	North Carolina	McGuire Nuclear Station			420	0.9057***
44	North Carolina	Shearon Harris Nuclear Power Plant			519	0.9099***
45	Ohio	Davis-Besse Nuclear Power Station			156	0.9177***
46	Ohio	Perry Nuclear Power Plant			661	0.9538***
47	Pennsylvania	Beaver Valley Power Station			935	0.9556***
48	Pennsylvania	Limerick Generating Station			1314	0.9668***
49	Pennsylvania	Peach Bottom Atomic Power Station			649	0.8792***
50	Pennsylvania	Susquehanna Steam Electric Station			319	0.9155***
51	Pennsylvania	Three Mile Island Nuclear Station			336	0.8958***
52	South Carolina	Catawba Nuclear Station			297	0.9178***
53	South Carolina	H. B. Robinson Steam Electric Plant			148	0.8700***
54	South Carolina	Oconee Nuclear Station			323	0.8792***
55	South Carolina	Virgil C. Summer Nuclear Station			222	0.8458***
56	Tennessee	Sequoyah Nuclear Plant			190	0.8141***
57	Tennessee	Watts Bar Nuclear Plant			158	0.8235***
58	Texas	Comanche Peak Steam Electric Station			362	0.8140***
59	Texas	South Texas Project			60	0.6107***
60	Vermont	Vermont Yankee Nuclear Power Plant			323	0.8647***
61	Virginia	North Anna Power Station			394	0.8488***
62	Virginia	Surry Nuclear Power Station			501	0.9571***
63	Washington	Columbia Generating Station			84	0.7070***
64	Wisconsin	Kewaunee Power Station			189	0.8570***
65	Wisconsin	Point Beach Nuclear Plant				
		Total	31	38	27220	
		Percent Total	53%	64%		

Note: Cluster 1: Index 13, 16 & 17; Cluster 2: Index 25 & 27; Cluster 3: Index 35 & 37; Cluster 4: Index 39 & 40; Cluster 5: Index 64 & 65
Green flag = statistically significant association at either the p< 0.1, p<0.05, p<0.01 or p<0.001 level; Red flag = otherwise

Table 25

Summary of Results of the Multivariate Regression (Ordinary Least Square) Analysis between Distance (LN) and Independent Variables at Individual NPPs in Model 2

			Model 2 (OLS)							
Index	State	Plant	Color %	Pop. Den. (LN)	Below Poverty %	Owner units %	At least one race	At least one socio	N	Moran's I
1	Alabama	Browns Ferry Nuclear Plant					Yes	Yes	223	0.8771***
2	Alabama	Joseph M. Farley Nuclear Plant					No	Yes	110	0.7795***
3	Arizona	Palo Verde Nuclear Generating Station					Yes	Yes	534	0.7159***
4	Arkansas	Arkansas Nuclear One					No	No	72	0.8306***
5	California	Diablo Canyon Nuclear Power Plant					Yes	Yes	92	0.5501***
6	California	San Onofre Nuclear Generating Station					Yes	No	1588	0.9313***
7	Connecticut	Millstone Power Station					No	Yes	642	0.9086***
8	Florida	Crystal River Nuclear Generating Plant					Yes	Yes	225	0.8452***
9	Florida	St. Lucie Plant					Yes	Yes	268	0.9039***
10	Florida	Turkey Point Nuclear Generating					Yes	Yes	691	0.9089***
11	Georgia	Edwin I. Hatch Nuclear Plant					No	No	88	0.6925***
12	Georgia	Vogtle Electric Generating Plant					No	Yes	152	0.7276***
13	Illinois	Braidwood Station					Yes	Yes	1668	0.8495***
14	Illinois	Byron Station					Yes	No	201	0.8261***
15	Illinois	Clinton Power Station					No	No	207	0.8264***
16	Illinois	Dresden Nuclear Power Station								
17	Illinois	LaSalle County Station								
18	Illinois	Quad Cities Nuclear Power Station					No	Yes	150	0.8097***
19	Iowa	Duane Arnold Energy Center					No	Yes	156	0.8265***
20	Kansas	Wolf Creek Generating Station					No	No	50	0.5533***
21	Louisiana	River Bend Station					Yes	Yes	164	0.7717***
22	Louisiana	Waterford Steam Electric Station					Yes	Yes	247	0.8769***
23	Maryland	Calvert Cliffs Nuclear Power Plant					No	Yes	786	0.8392***
24	Massachusetts	Pilgrim Nuclear Power Station					No	Yes	616	0.8719***
25	Michigan	Donald C. Cook Nuclear Power Plant					No	No	430	0.8841***
26	Michigan	Fermi					Yes	Yes	1312	0.9487***
27	Michigan	Palisades Nuclear Plant								
28	Minnesota	Monticello Nuclear Generating Plant					Yes	Yes	456	0.8613***
29	Minnesota	Prairie Island Nuclear Generating Plant					No	Yes	448	0.8294***
30	Mississippi	Grand Gulf Nuclear Station					Yes	Yes	89	0.5793***
31	Missouri	Callaway Plant					No	Yes	113	0.7271***
32	Nebraska	Cooper Nuclear Station					No	Yes	43	0.4479***
33	Nebraska	Fort Calhoun Station					No	Yes	282	0.8015***
34	New Hampshire	Seabrook Station					Yes	Yes	828	0.9138***
35	New Jersey	Hope Creek Generating Station					Yes	Yes	418	0.8751***
36	New Jersey	Oyster Creek Nuclear Generating Station					Yes	Yes	602	0.8728***
37	New Jersey	Salem Nuclear Generating Station								
38	New York	Indian Point Nuclear Generating					Yes	Yes	4068	0.9481***
39	New York	James A. FitzPatrick Nuclear Power Plant					Yes	Yes	231	0.8699***
40	New York	Nine Mile Point Nuclear Station								
41	New York	R.E. Ginna Nuclear Power Plant					Yes	Yes	281	0.8292***
42	North Carolina	Brunswick Steam Electric Plant					No	No	129	0.8164***
43	North Carolina	McGuire Nuclear Station					Yes	Yes	420	0.8471***
44	North Carolina	Shearon Harris Nuclear Power Plant					Yes	Yes	519	0.8942***
45	Ohio	Davis-Besse Nuclear Power Station					No	Yes	156	0.8977***
46	Ohio	Perry Nuclear Power Plant					Yes	Yes	661	0.9526***
47	Pennsylvania	Beaver Valley Power Station					No	Yes	935	0.9477***
48	Pennsylvania	Limerick Generating Station					No	Yes	1314	0.9669***
49	Pennsylvania	Peach Bottom Atomic Power Station					Yes	Yes	649	0.8653***
50	Pennsylvania	Susquehanna Steam Electric Station					No	No	319	0.9105***
51	Pennsylvania	Three Mile Island Nuclear Station					Yes	Yes	336	0.8485***
52	South Carolina	Catawba Nuclear Station					Yes	Yes	297	0.8663***
53	South Carolina	H. B. Robinson Steam Electric Plant					No	No	148	0.8684***
54	South Carolina	Oconee Nuclear Station					Yes	Yes	323	0.8355***
55	South Carolina	Virgil C. Summer Nuclear Station					No	No	222	0.8232***
56	Tennessee	Sequoyah Nuclear Plant					No	Yes	190	0.8006***
57	Tennessee	Watts Bar Nuclear Plant					No	Yes	158	0.8198***
58	Texas	Comanche Peak Steam Electric Station					Yes	Yes	362	0.8087***
59	Texas	South Texas Project					No	Yes	60	0.5671***
60	Vermont	Vermont Yankee Nuclear Power Plant					Yes	Yes	323	0.846***
61	Virginia	North Anna Power Station					Yes	Yes	394	0.8449***
62	Virginia	Surry Nuclear Power Station					No	No	501	0.9546***
63	Washington	Columbia Generating Station					Yes	Yes	84	0.7058***
64	Wisconsin	Kewaunee Power Station					No	No	189	0.8596***
65	Wisconsin	Point Beach Nuclear Plant								
		Total	31	40	25	16	31	46		
		Percent Total	53%	68%	42%	27%	53%	78%		

Note: Cluster 1: Index 13, 16 & 17; Cluster 2: Index 25 & 27; Cluster 3: Index 35 & 37; Cluster 4: Index 39 & 40; Cluster 5: Index 64 & 65
Green flag = statistically significant association at either the p< 0.1, p<0.05, p<0.01 or p<0.001 level; Red flag = otherwise

Table 26

Summary of Results of the Multivariate Regression (Ordinary Least Square) Analysis between Distance (LN) and Independent Variables at Individual NPPs in Model 3

			Model 3 (OLS)							
Index	State	Plant	Black %	Asian %	Hispanic %	Pop. Den. (LN)	At least one race	At least one socio	N	Moran's I
1	Alabama	Browns Ferry Nuclear Plant					No	No	223	0.8641***
2	Alabama	Joseph M. Farley Nuclear Plant					Yes	Yes	110	0.6899***
3	Arizona	Palo Verde Nuclear Generating Station					Yes	Yes	534	0.7476***
4	Arkansas	Arkansas Nuclear One					Yes	Yes	72	0.6675***
5	California	Diablo Canyon Nuclear Power Plant					Yes	No	92	0.5766***
6	California	San Onofre Nuclear Generating Station					Yes	Yes	1588	0.9194***
7	Connecticut	Millstone Power Station					No	Yes	642	0.9226***
8	Florida	Crystal River Nuclear Generating Plant					No	Yes	225	0.8456***
9	Florida	St. Lucie Plant					Yes	No	268	0.9061***
10	Florida	Turkey Point Nuclear Generating					Yes	Yes	691	0.8869***
11	Georgia	Edwin I. Hatch Nuclear Plant					Yes	No	88	0.6677***
12	Georgia	Vogtle Electric Generating Plant					No	No	152	0.7336***
13	Illinois	Braidwood Station					Yes	Yes	1668	0.8486***
14	Illinois	Byron Station					Yes	No	201	0.8112***
15	Illinois	Clinton Power Station					No	No	207	0.8226***
16	Illinois	Dresden Nuclear Power Station								
17	Illinois	LaSalle County Station								
18	Illinois	Quad Cities Nuclear Power Station					No	Yes	150	0.8036***
19	Iowa	Duane Arnold Energy Center					Yes	Yes	156	0.8881***
20	Kansas	Wolf Creek Generating Station					No	No	50	0.5624***
21	Louisiana	River Bend Station					Yes	No	164	0.7902***
22	Louisiana	Waterford Steam Electric Station					Yes	Yes	247	0.8792***
23	Maryland	Calvert Cliffs Nuclear Power Plant					Yes	Yes	786	0.8271***
24	Massachusetts	Pilgrim Nuclear Power Station					Yes	Yes	616	0.8705***
25	Michigan	Donald C. Cook Nuclear Power Plant					No	No	430	0.8726***
26	Michigan	Fermi					Yes	Yes	1312	0.9472***
27	Michigan	Palisades Nuclear Plant								
28	Minnesota	Monticello Nuclear Generating Plant					Yes	Yes	456	0.8642***
29	Minnesota	Prairie Island Nuclear Generating Plant					No	Yes	448	0.8322***
30	Mississippi	Grand Gulf Nuclear Station					Yes	Yes	89	0.5825***
31	Missouri	Callaway Plant					No	Yes	113	0.7505***
32	Nebraska	Cooper Nuclear Station					No	No	43	0.4733***
33	Nebraska	Fort Calhoun Station					Yes	Yes	282	0.7912***
34	New Hampshire	Seabrook Station					Yes	Yes	828	0.8922***
35	New Jersey	Hope Creek Generating Station					Yes	Yes	418	0.8782***
36	New Jersey	Oyster Creek Nuclear Generating Station					Yes	Yes	602	0.8674***
37	New Jersey	Salem Nuclear Generating Station								
38	New York	Indian Point Nuclear Generating					Yes	Yes	4068	0.9407***
39	New York	James A. FitzPatrick Nuclear Power Plant					No	Yes	231	0.8979***
40	New York	Nine Mile Point Nuclear Station								
41	New York	R.E. Ginna Nuclear Power Plant					No	Yes	281	0.8558***
42	North Carolina	Brunswick Steam Electric Plant					Yes	No	129	0.8155***
43	North Carolina	McGuire Nuclear Station					Yes	Yes	420	0.8852***
44	North Carolina	Shearon Harris Nuclear Power Plant					Yes	Yes	519	0.8788***
45	Ohio	Davis-Besse Nuclear Power Station					No	No	156	0.9071***
46	Ohio	Perry Nuclear Power Plant					Yes	Yes	661	0.9504***
47	Pennsylvania	Beaver Valley Power Station					No	No	935	0.9543***
48	Pennsylvania	Limerick Generating Station					Yes	Yes	1314	0.9664***
49	Pennsylvania	Peach Bottom Atomic Power Station					Yes	Yes	649	0.8335***
50	Pennsylvania	Susquehanna Steam Electric Station					Yes	No	319	0.8953***
51	Pennsylvania	Three Mile Island Nuclear Station					Yes	Yes	336	0.8573***
52	South Carolina	Catawba Nuclear Station					Yes	Yes	297	0.8774***
53	South Carolina	H. B. Robinson Steam Electric Plant					Yes	No	148	0.8561***
54	South Carolina	Oconee Nuclear Station					Yes	No	323	0.8722***
55	South Carolina	Virgil C. Summer Nuclear Station					No	No	222	0.8375***
56	Tennessee	Sequoyah Nuclear Plant					Yes	Yes	190	0.7891***
57	Tennessee	Watts Bar Nuclear Plant					No	Yes	158	0.8227***
58	Texas	Comanche Peak Steam Electric Station					Yes	Yes	362	0.801***
59	Texas	South Texas Project					No	Yes	60	0.6038***
60	Vermont	Vermont Yankee Nuclear Power Plant					No	Yes	323	0.8633***
61	Virginia	North Anna Power Station					Yes	Yes	394	0.8503***
62	Virginia	Surry Nuclear Power Station					Yes	No	501	0.9392***
63	Washington	Columbia Generating Station					Yes	Yes	84	0.6823***
64	Wisconsin	Kewaunee Power Station					No	No	189	0.8545***
65	Wisconsin	Point Beach Nuclear Plant								
		Total	22	19	28	39	39	39	27220	
		Percent Total	37%	32%	47%	66%	66%	66%		

Note: Cluster 1: Index 13, 16 & 17; Cluster 2: Index 25 & 27; Cluster 3: Index 35 & 37; Cluster 4: Index 39 & 40; Cluster 5: Index 64 & 65
Green flag = statistically significant association at either the p< 0.1, p<0.05, p<0.01 or p<0.001 level; Red flag = otherwise

Table 27

Summary of Results of the Multivariate Regression (Ordinary Least Square) Analysis between Distance (LN) and Independent Variables at Individual NPPs in Model 4

			Model 4 (OLS)									
Index	State	Plant	Black %	Asian %	Hispanic %	Pop. Den. (LN)	Below Poverty %	Owner Unit %	At least one race	At least one socio	N	Moran's I
1	Alabama	Browns Ferry Nuclear Plant							Yes	Yes	223	0.8417***
2	Alabama	Joseph M. Farley Nuclear Plant							Yes	Yes	110	0.6534***
3	Arizona	Palo Verde Nuclear Generating Station							Yes	Yes	534	0.6826***
4	Arkansas	Arkansas Nuclear One							Yes	Yes	72	0.6620***
5	California	Diablo Canyon Nuclear Power Plant							Yes	Yes	92	0.4883***
6	California	San Onofre Nuclear Generating Station							Yes	Yes	1588	0.9180***
7	Connecticut	Millstone Power Station							Yes	Yes	642	0.9058***
8	Florida	Crystal River Nuclear Generating Plant							Yes	Yes	225	0.8457***
9	Florida	St. Lucie Plant							Yes	Yes	268	0.8982***
10	Florida	Turkey Point Nuclear Generating							Yes	Yes	691	0.8832***
11	Georgia	Edwin I. Hatch Nuclear Plant							Yes	No	88	0.6425***
12	Georgia	Vogtle Electric Generating Plant							No	Yes	152	0.7218***
13	Illinois	Braidwood Station							Yes	Yes	1668	0.8454***
14	Illinois	Byron Station							Yes	Yes	201	0.8001***
15	Illinois	Clinton Power Station							No	No	207	0.8197***
16	Illinois	Dresden Nuclear Power Station										
17	Illinois	LaSalle County Station										
18	Illinois	Quad Cities Nuclear Power Station							No	Yes	150	0.7932***
19	Iowa	Duane Arnold Energy Center							Yes	Yes	156	0.8182***
20	Kansas	Wolf Creek Generating Station							No	No	50	0.5546***
21	Louisiana	River Bend Station							Yes	Yes	164	0.7637***
22	Louisiana	Waterford Steam Electric Station							Yes	Yes	247	0.8583***
23	Maryland	Calvert Cliffs Nuclear Power Plant							Yes	Yes	786	0.8295***
24	Massachusetts	Pilgrim Nuclear Power Station							Yes	Yes	616	0.8670***
25	Michigan	Donald C. Cook Nuclear Power Plant							No	No	430	0.8736***
26	Michigan	Fermi							Yes	Yes	1312	0.9377***
27	Michigan	Palisades Nuclear Plant										
28	Minnesota	Monticello Nuclear Generating Plant							Yes	Yes	456	0.8579***
29	Minnesota	Prairie Island Nuclear Generating Plant							No	Yes	448	0.8294***
30	Mississippi	Grand Gulf Nuclear Station							Yes	Yes	89	0.5728***
31	Missouri	Callaway Plant							No	Yes	113	0.7257***
32	Nebraska	Cooper Nuclear Station							No	Yes	43	0.4009***
33	Nebraska	Fort Calhoun Station							Yes	Yes	282	0.7853***
34	New Hampshire	Seabrook Station							Yes	Yes	828	0.89351***
35	New Jersey	Hope Creek Generating Station							Yes	Yes	418	0.8757***
36	New Jersey	Oyster Creek Nuclear Generating Station							Yes	Yes	602	0.8553***
37	New Jersey	Salem Nuclear Generating Station										
38	New York	Indian Point Nuclear Generating							Yes	Yes	4068	0.9434***
39	New York	James A. FitzPatrick Nuclear Power Plant							Yes	Yes	231	0.8675***
40	New York	Nine Mile Point Nuclear Station										
41	New York	R.E. Ginna Nuclear Power Plant							Yes	Yes	281	0.8239***
42	North Carolina	Brunswick Steam Electric Plant							No	No	129	0.8152***
43	North Carolina	McGuire Nuclear Station							Yes	Yes	420	0.8293***
44	North Carolina	Shearon Harris Nuclear Power Plant							Yes	Yes	519	0.8635***
45	Ohio	Davis-Besse Nuclear Power Station							No	Yes	156	0.8882***
46	Ohio	Perry Nuclear Power Plant							Yes	Yes	661	0.9481***
47	Pennsylvania	Beaver Valley Power Station							No	Yes	935	0.9478***
48	Pennsylvania	Limerick Generating Station							No	Yes	1314	0.9666***
49	Pennsylvania	Peach Bottom Atomic Power Station							Yes	Yes	649	0.82719***
50	Pennsylvania	Susquehanna Steam Electric Station							Yes	No	319	0.8916***
51	Pennsylvania	Three Mile Island Nuclear Station							Yes	Yes	336	0.8368***
52	South Carolina	Catawba Nuclear Station							Yes	Yes	297	0.8678***
53	South Carolina	H. B. Robinson Steam Electric Plant							Yes	No	148	0.8408***
54	South Carolina	Oconee Nuclear Station							Yes	Yes	323	0.8181***
55	South Carolina	Virgil C. Summer Nuclear Station							Yes	No	222	0.8130***
56	Tennessee	Sequoyah Nuclear Plant							Yes	Yes	190	0.7617***
57	Tennessee	Watts Bar Nuclear Plant							No	Yes	158	0.8199***
58	Texas	Comanche Peak Steam Electric Station							No	Yes	362	0.80155***
59	Texas	South Texas Project							Yes	Yes	60	0.5606***
60	Vermont	Vermont Yankee Nuclear Power Plant							Yes	Yes	323	0.8428***
61	Virginia	North Anna Power Station							Yes	Yes	394	0.8453***
62	Virginia	Surry Nuclear Power Station							Yes	No	501	0.9382***
63	Washington	Columbia Generating Station							Yes	Yes	84	0.6702***
64	Wisconsin	Kewaunee Power Station							No	No	189	0.8500***
65	Wisconsin	Point Beach Nuclear Plant										
		Total	33	19	31	40	26	19	44	49	27,220	
		Percent Total	56%	32%	53%	68%	44%	32%	75%	83%		

Note: Cluster 1: Index 13, 16 & 17; Cluster 2: Index 25 & 27; Cluster 3: Index 35 & 37; Cluster 4: Index 39 & 40; Cluster 5: Index 64 & 65
Green flag = statistically significant association at either the p< 0.1, p<0.05, p<0.01 or p<0.001 level; Red flag = otherwise

5.4 SAR of hosting community study variables at individual NPPs

The estimated results of models run using the spatial weight matrix of queen-based contiguity in OLS regression analyses yielded Moran's I values that were significantly distant from zero at the $p<0.001$ level, indicative of a need to incorporate spatial autocorrelation measures into the current regression analyses (Tables 24, 25, 26, and 27). Next, I looked at four additional statistics provided with the output of the OLS regression analyses in order to determine which SAR model was most appropriate. As discussed above, the results of four tests—namely, LM (lag), LM (error), Robust LM (lag), or Robust LM (error)—were used to inform the selection of an appropriate SAR model from either a spatial error or lag model.

I summarized the results of each model I tested for spatial autocorrelation (Tables 28, 29, 30, and 31). Each summary table informs on the statistical significance of the associations that exist between and among a number of observations, as well as providing the Moran's I statistics for individual NPPs and the five NPPs clusters.

In regard to model 1, when considering spatial autocorrelation with a spatially lagged variable, the number locations that exhibited a significant association between percent Color and distance (LN) were reduced by 10 (17%), whereas those for which population density is significant was reduced by 22 (17%), while the Moran's I value was also dramatically decreased (Table 28). For model 2, the number of locations that exhibited statistically significant associations between the dependent variable and percent Color was decreased by 6 (10%), by 18 (31%) for population density (LN), by 5 (8%) for percent living below the federal poverty line, and by 9 (15%) for percent living in owner-occupied housing units (Table 29). Overall, there were 6 (10%) locations at which at least

one racial/ethnic variable exhibited a statistically significant relationship with distance (LN), whereas 28 (47%) locations exhibited a statistically significant relationship between distance (LN) and at least one socio-economic variable. Moran's I coefficients were low, although some still were significantly different from zero at the $p<0.05$, $p<0.01$ or $p<0.001$ levels.

In model 3, percent Black exhibited a statistically significant relationship with distance (LN) at 5 (8%) locations, percent Asian at 1 (2%) location, percent Hispanic at 4 (7%) locations and population density at (LN) 22 (37%) locations(Table 30). Overall, after accounting for the effects of spatial autocorrelation, there was a statistically significant relationship between distance (LN) and at least one racial/ethnic variable at 9 (15%) locations, and between distance (LN) and at least one socio-economic variable at 22 (37%) locations.

In model 4, which includes both those variables analyzed in model 3 as well as additional, nested, socio-economic variables, percent Black exhibited a statistically significant association with distance (LN) at 3 (5%) locations, percent Asian at 1 (2%) location, percent Hispanic at 5 (8%) locations, population density (LN) at 21 (36%) locations, percent living below the federal poverty line at 4 (7%) locations, and percent living in owner-occupied housing units at 8 (14%) locations. Overall, there was a statistically significant association between the dependent variable, distance (LN), and at least one racial/ethnic variable at 8 (14%) locations and at least one socio-economic variable at 30 (51%) locations (Table 31). Moran's I values for models 3 and 4 exhibited low coefficients, with some not being significantly different from zero.

Table 28

Summary of Results of SAR Analysis between Distance (LN) and Independent Variables at Individual NPPs in Model 1

			Model 1 (SAR)			
Index	State	Plant	Color %	Pop. Den. (LN)	N	Moran's I
1	Alabama	Browns Ferry Nuclear Plant			223	0.2614***
2	Alabama	Joseph M. Farley Nuclear Plant			110	0.1554***
3	Arizona	Palo Verde Nuclear Generating Station			534	0.1147***
4	Arkansas	Arkansas Nuclear One			72	0.1556*
5	California	Diablo Canyon Nuclear Power Plant			92	0.0464
6	California	San Onofre Nuclear Generating Station			1588	0.1253***
7	Connecticut	Millstone Power Station			642	0.0193
8	Florida	Crystal River Nuclear Generating Plant			225	0.696*
9	Florida	St. Lucie Plant			268	0.0173
10	Florida	Turkey Point Nuclear Generating			691	0.0099
11	Georgia	Edwin I. Hatch Nuclear Plant			88	0.2886***
12	Georgia	Vogtle Electric Generating Plant			152	0.2909***
13	Illinois	Braidwood Station			1668	0.0101
14	Illinois	Byron Station			201	0.3896***
15	Illinois	Clinton Power Station			207	0.0366
16	Illinois	Dresden Nuclear Power Station				
17	Illinois	LaSalle County Station				
18	Illinois	Quad Cities Nuclear Power Station			150	0.1938***
19	Iowa	Duane Arnold Energy Center			156	0.0817*
20	Kansas	Wolf Creek Generating Station			50	0.1254**
21	Louisiana	River Bend Station			164	0.1417***
22	Louisiana	Waterford Steam Electric Station			247	0.099***
23	Maryland	Calvert Cliffs Nuclear Power Plant			786	0.0147*
24	Massachusetts	Pilgrim Nuclear Power Station			616	0.0013
25	Michigan	Donald C. Cook Nuclear Power Plant			430	0.0855***
26	Michigan	Fermi			1312	0.1188***
27	Michigan	Palisades Nuclear Plant				
28	Minnesota	Monticello Nuclear Generating Plant			456	0.1696***
29	Minnesota	Prairie Island Nuclear Generating Plant			448	0.0409*
30	Mississippi	Grand Gulf Nuclear Station			89	0.2781***
31	Missouri	Callaway Plant			113	0.1532***
32	Nebraska	Cooper Nuclear Station			43	0.2236*
33	Nebraska	Fort Calhoun Station			282	0.023
34	New Hampshire	Seabrook Station			828	0.1764***
35	New Jersey	Hope Creek Generating Station			418	0.1063***
36	New Jersey	Oyster Creek Nuclear Generating Station			602	0.1628***
37	New Jersey	Salem Nuclear Generating Station				
38	New York	Indian Point Nuclear Generating			4068	0.0542*
39	New York	James A. FitzPatrick Nuclear Power Plant			231	0.2065***
40	New York	Nine Mile Point Nuclear Station				
41	New York	R.E. Ginna Nuclear Power Plant			281	0.0599*
42	North Carolina	Brunswick Steam Electric Plant			129	0.2021***
43	North Carolina	McGuire Nuclear Station			420	0.2128***
44	North Carolina	Shearon Harris Nuclear Power Plant			519	0.0872***
45	Ohio	Davis-Besse Nuclear Power Station			156	0.1453***
46	Ohio	Perry Nuclear Power Plant			661	0.0442***
47	Pennsylvania	Beaver Valley Power Station			935	0.2197***
48	Pennsylvania	Limerick Generating Station			1314	0.1769***
49	Pennsylvania	Peach Bottom Atomic Power Station			649	0.1678***
50	Pennsylvania	Susquehanna Steam Electric Station			319	0.1547**
51	Pennsylvania	Three Mile Island Nuclear Station			336	0.1954***
52	South Carolina	Catawba Nuclear Station			297	0.1021***
53	South Carolina	H. B. Robinson Steam Electric Plant			148	0.1466***
54	South Carolina	Oconee Nuclear Station			323	0.0901***
55	South Carolina	Virgil C. Summer Nuclear Station			222	0.2364***
56	Tennessee	Sequoyah Nuclear Plant			190	0.0997***
57	Tennessee	Watts Bar Nuclear Plant			158	0.2865***
58	Texas	Comanche Peak Steam Electric Station			362	0.2641***
59	Texas	South Texas Project			60	0.0472
60	Vermont	Vermont Yankee Nuclear Power Plant			323	0.0339
61	Virginia	North Anna Power Station			394	0.3436***
62	Virginia	Surry Nuclear Power Station			501	0.1772***
63	Washington	Columbia Generating Station			84	0.069
64	Wisconsin	Kewaunee Power Station			189	0.1416***
65	Wisconsin	Point Beach Nuclear Plant				
		Total	10	22	27220	
		Percent Total	17%	37%		

Note: Cluster 1: Index 13, 16 & 17; Cluster 2: Index 25 & 27; Cluster 3: Index 35 & 37; Cluster 4: Index 39 & 40; Cluster 5: Index 64 & 65
Green flag = statistically significant association at either the p< 0.1, p<0.05, p<0.01 or p<0.001 level; Red flag = otherwise

Table 29

Summary of Results of SAR Analysis between Distance (LN) and Independent Variables at Individual NPPs in Model 2

			Model 2 (SAR)							
Index	State	Plant	Color %	Pop. Den. (LN)	Below Poverty %	Owner units %	At least one race	At least one socio	N	Moran's I
1	Alabama	Browns Ferry Nuclear Plant					Yes	Yes	223	0.2569***
2	Alabama	Joseph M. Farley Nuclear Plant					No	No	110	0.1485***
3	Arizona	Palo Verde Nuclear Generating Station					Yes	Yes	534	0.121***
4	Arkansas	Arkansas Nuclear One					No	Yes	72	0.1395*
5	California	Diablo Canyon Nuclear Power Plant					Yes	Yes	92	0.0164
6	California	San Onofre Nuclear Generating Station					Yes	Yes	1588	0.1251***
7	Connecticut	Millstone Power Station					No	Yes	642	0.0176
8	Florida	Crystal River Nuclear Generating Plant					No	Yes	225	0.0908*
9	Florida	St. Lucie Plant					No	Yes	268	0.0185
10	Florida	Turkey Point Nuclear Generating					Yes	Yes	691	0.0114
11	Georgia	Edwin I. Hatch Nuclear Plant					No	No	88	0.2913***
12	Georgia	Vogtle Electric Generating Plant					No	Yes	152	0.2685***
13	Illinois	Braidwood Station					No	No	1668	0.0098
14	Illinois	Byron Station					No	No	201	0.3934***
15	Illinois	Clinton Power Station					No	No	207	0.0368
16	Illinois	Dresden Nuclear Power Station								
17	Illinois	LaSalle County Station								
18	Illinois	Quad Cities Nuclear Power Station					No	Yes	150	0.1852***
19	Iowa	Duane Arnold Energy Center					No	Yes	156	0.0656*
20	Kansas	Wolf Creek Generating Station					No	No	50	0.0321
21	Louisiana	River Bend Station					No	Yes	164	0.1493***
22	Louisiana	Waterford Steam Electric Station					No	Yes	247	0.0958***
23	Maryland	Calvert Cliffs Nuclear Power Plant					No	No	786	0.0157*
24	Massachusetts	Pilgrim Nuclear Power Station					No	No	616	0.003
25	Michigan	Donald C. Cook Nuclear Power Plant					No	Yes	430	0.0862***
26	Michigan	Fermi					No	No	1312	0.1871***
27	Michigan	Palisades Nuclear Plant								
28	Minnesota	Monticello Nuclear Generating Plant					No	Yes	456	0.1708***
29	Minnesota	Prairie Island Nuclear Generating Plant					No	No	448	0.0411*
30	Mississippi	Grand Gulf Nuclear Station					No	No	89	0.3058***
31	Missouri	Callaway Plant					No	No	113	0.1523***
32	Nebraska	Cooper Nuclear Station					No	Yes	43	0.1849*
33	Nebraska	Fort Calhoun Station					No	Yes	282	0.0223
34	New Hampshire	Seabrook Station					Yes	No	828	0.1774***
35	New Jersey	Hope Creek Generating Station					No	No	418	0.1093***
36	New Jersey	Oyster Creek Nuclear Generating Station					No	No	602	0.1636***
37	New Jersey	Salem Nuclear Generating Station								
38	New York	Indian Point Nuclear Generating					No	Yes	4068	0.1254**
39	New York	James A. FitzPatrick Nuclear Power Plant					No	No	231	0.2043***
40	New York	Nine Mile Point Nuclear Station								
41	New York	R.E. Ginna Nuclear Power Plant					No	Yes	281	0.0793*
42	North Carolina	Brunswick Steam Electric Plant					No	No	129	0.2004***
43	North Carolina	McGuire Nuclear Station					No	No	420	0.2075***
44	North Carolina	Shearon Harris Nuclear Power Plant					No	Yes	519	0.0852***
45	Ohio	Davis-Besse Nuclear Power Station					No	No	156	0.1459***
46	Ohio	Perry Nuclear Power Plant					No	No	661	0.0441*
47	Pennsylvania	Beaver Valley Power Station					No	Yes	935	0.2193***
48	Pennsylvania	Limerick Generating Station					No	No	1314	0.1772***
49	Pennsylvania	Peach Bottom Atomic Power Station					No	No	649	0.1672***
50	Pennsylvania	Susquehanna Steam Electric Station					No	No	319	0.1578**
51	Pennsylvania	Three Mile Island Nuclear Station					No	Yes	336	0.1955***
52	South Carolina	Catawba Nuclear Station					No	No	297	0.099***
53	South Carolina	H. B. Robinson Steam Electric Plant					No	No	148	0.1489***
54	South Carolina	Oconee Nuclear Station					No	No	323	0.09***
55	South Carolina	Virgil C. Summer Nuclear Station					No	No	222	0.2297***
56	Tennessee	Sequoyah Nuclear Plant					No	Yes	190	0.0945*
57	Tennessee	Watts Bar Nuclear Plant					No	No	158	0.2879***
58	Texas	Comanche Peak Steam Electric Station					No	Yes	362	0.2605***
59	Texas	South Texas Project					No	No	60	0.0378
60	Vermont	Vermont Yankee Nuclear Power Plant					No	No	323	0.0321
61	Virginia	North Anna Power Station					No	No	394	0.3436***
62	Virginia	Surry Nuclear Power Station					No	Yes	501	0.1818***
63	Washington	Columbia Generating Station					No	Yes	84	0.08
64	Wisconsin	Kewaunee Power Station					No	Yes	189	0.1157***
65	Wisconsin	Point Beach Nuclear Plant								
		Total	6	18	5	9	6	28	27220	
		Percent Total	10%	31%	8%	15%	10%	47%		

Note: Cluster 1: Index 13, 16 & 17; Cluster 2: Index 25 & 27; Cluster 3: Index 35 & 37; Cluster 4: Index 39 & 40; Cluster 5: Index 64 & 65
Green flag = statistically significant association at either the p< 0.1, p<0.05, p<0.01 or p<0.001 level; Red flag = otherwise

Table 30

Summary of Results of SAR Analysis between Distance (LN) and Independent Variables at Individual NPPs in Model 3

			Model 3 (SAR)							
Index	State	Plant	Black %	Asian %	Hispanic %	Pop. Den. (LN)	At least one race	At least one socio	N	Moran's I
1	Alabama	Browns Ferry Nuclear Plant					Yes	No	223	0.2572***
2	Alabama	Joseph M. Farley Nuclear Plant					No	No	110	0.1499***
3	Arizona	Palo Verde Nuclear Generating Station					No	No	534	0.1148***
4	Arkansas	Arkansas Nuclear One					Yes	Yes	72	0.1176*
5	California	Diablo Canyon Nuclear Power Plant					Yes	No	92	0.0373
6	California	San Onofre Nuclear Generating Station					Yes	Yes	1588	0.1257***
7	Connecticut	Millstone Power Station					No	Yes	642	0.0206
8	Florida	Crystal River Nuclear Generating Plant					No	No	225	0.071*
9	Florida	St. Lucie Plant					No	Yes	268	0.0196
10	Florida	Turkey Point Nuclear Generating					Yes	Yes	691	0.0107
11	Georgia	Edwin I. Hatch Nuclear Plant					Yes	No	88	0.2426***
12	Georgia	Vogtle Electric Generating Plant					No	No	152	0.2905***
13	Illinois	Braidwood Station					No	Yes	1668	0.0102
14	Illinois	Byron Station					No	No	201	0.3888***
15	Illinois	Clinton Power Station					No	No	207	0.0367
16	Illinois	Dresden Nuclear Power Station								
17	Illinois	LaSalle County Station								
18	Illinois	Quad Cities Nuclear Power Station					No	Yes	150	0.1922***
19	Iowa	Duane Arnold Energy Center					No	Yes	156	0.0755*
20	Kansas	Wolf Creek Generating Station					No	No	50	0.0245*
21	Louisiana	River Bend Station					No	No	164	0.1412***
22	Louisiana	Waterford Steam Electric Station					No	Yes	247	0.096***
23	Maryland	Calvert Cliffs Nuclear Power Plant					No	No	786	0.0124*
24	Massachusetts	Pilgrim Nuclear Power Station					No	No	616	0.001
25	Michigan	Donald C. Cook Nuclear Power Plant					No	Yes	430	0.0848***
26	Michigan	Fermi					No	No	1312	0.1883***
27	Michigan	Palisades Nuclear Plant								
28	Minnesota	Monticello Nuclear Generating Plant					No	Yes	456	0.169***
29	Minnesota	Prairie Island Nuclear Generating Plant					No	No	448	0.0406*
30	Mississippi	Grand Gulf Nuclear Station					Yes	No	89	0.2645***
31	Missouri	Callaway Plant					No	No	113	0.1448***
32	Nebraska	Cooper Nuclear Station					No	No	43	0.2251***
33	Nebraska	Fort Calhoun Station					No	Yes	282	0.0229
34	New Hampshire	Seabrook Station					No	No	828	0.1765***
35	New Jersey	Hope Creek Generating Station					No	No	418	0.1059***
36	New Jersey	Oyster Creek Nuclear Generating Station					No	No	602	0.1633***
37	New Jersey	Salem Nuclear Generating Station								
38	New York	Indian Point Nuclear Generating					No	No	4068	0.3521*
39	New York	James A. FitzPatrick Nuclear Power Plant					No	No	231	0.207***
40	New York	Nine Mile Point Nuclear Station								
41	New York	R.E. Ginna Nuclear Power Plant					No	Yes	281	0.0589*
42	North Carolina	Brunswick Steam Electric Plant					No	Yes	129	0.199***
43	North Carolina	McGuire Nuclear Station					No	Yes	420	0.213***
44	North Carolina	Shearon Harris Nuclear Power Plant					No	No	519	0.0875***
45	Ohio	Davis-Besse Nuclear Power Station					No	No	156	0.1436***
46	Ohio	Perry Nuclear Power Plant					No	No	661	0.0442***
47	Pennsylvania	Beaver Valley Power Station					No	No	935	0.2194***
48	Pennsylvania	Limerick Generating Station					No	Yes	1314	0.1774***
49	Pennsylvania	Peach Bottom Atomic Power Station					No	No	649	0.1682***
50	Pennsylvania	Susquehanna Steam Electric Station					No	No	319	0.0521*
51	Pennsylvania	Three Mile Island Nuclear Station					No	Yes	336	0.1967***
52	South Carolina	Catawba Nuclear Station					No	No	297	0.104***
53	South Carolina	H. B. Robinson Steam Electric Plant					Yes	Yes	148	0.1301***
54	South Carolina	Oconee Nuclear Station					Yes	No	323	0.0847***
55	South Carolina	Virgil C. Summer Nuclear Station					No	No	222	0.2368***
56	Tennessee	Sequoyah Nuclear Plant					No	Yes	190	0.0997*
57	Tennessee	Watts Bar Nuclear Plant					No	No	158	0.2861***
58	Texas	Comanche Peak Steam Electric Station					No	Yes	362	0.2637***
59	Texas	South Texas Project					No	No	60	0.0556
60	Vermont	Vermont Yankee Nuclear Power Plant					No	No	323	0.0337
61	Virginia	North Anna Power Station					No	No	394	0.3435***
62	Virginia	Surry Nuclear Power Station					No	Yes	501	0.1744***
63	Washington	Columbia Generating Station					No	No	84	0.0541
64	Wisconsin	Kewaunee Power Station					No	Yes	189	0.1409***
65	Wisconsin	Point Beach Nuclear Plant								
		Total	5	1	4	22	9	22	27220	
		Percent Total	8%	2%	7%	37%	15%	37%		

Note: Cluster 1: Index 13, 16 & 17; Cluster 2: Index 25 & 27; Cluster 3: Index 35 & 37; Cluster 4: Index 39 & 40; Cluster 5: Index 64 & 65
Green flag = statistically significant association at either the p< 0.1, p<0.05, p<0.01 or p<0.001 level; Red flag = otherwise

Table 31

Summary of Results of SAR Analysis between Distance (LN) and Independent Variables at Individual NPPs in Model 4

			Model 4 (SAR)									
Index	State	Plant	Black %	Asian %	Hispanic %	Pop. Den. (LN)	Below Poverty %	Owner Unit %	At least one race	At least one socio	N	Moran's I
1	Alabama	Browns Ferry Nuclear Plant							Yes	Yes	223	0.2508***
2	Alabama	Joseph M. Farley Nuclear Plant							No	No	110	0.1331***
3	Arizona	Palo Verde Nuclear Generating Station							Yes	Yes	534	0.1218***
4	Arkansas	Arkansas Nuclear One							No	Yes	72	0.1025
5	California	Diablo Canyon Nuclear Power Plant							Yes	Yes	92	0.0217
6	California	San Onofre Nuclear Generating Station							Yes	Yes	1588	0.1254***
7	Connecticut	Millstone Power Station							No	Yes	642	0.0181
8	Florida	Crystal River Nuclear Generating Plant							No	Yes	225	0.0943*
9	Florida	St. Lucie Plant							No	Yes	268	0.0177
10	Florida	Turkey Point Nuclear Generating							Yes	Yes	691	0.0114
11	Georgia	Edwin I. Hatch Nuclear Plant							Yes	No	88	0.2395
12	Georgia	Vogtle Electric Generating Plant							No	Yes	152	0.2663***
13	Illinois	Braidwood Station							No	Yes	1668	0.0099
14	Illinois	Byron Station							No	No	201	0.3922***
15	Illinois	Clinton Power Station							No	No	207	0.0368
16	Illinois	Dresden Nuclear Power Station										
17	Illinois	LaSalle County Station										
18	Illinois	Quad Cities Nuclear Power Station							No	Yes	150	0.1851***
19	Iowa	Duane Arnold Energy Center							No	Yes	156	0.547
20	Kansas	Wolf Creek Generating Station							No	No	50	0.0325**
21	Louisiana	River Bend Station							No	Yes	164	0.149***
22	Louisiana	Waterford Steam Electric Station							No	Yes	247	0.0929***
23	Maryland	Calvert Cliffs Nuclear Power Plant							No	No	786	0.0254**
24	Massachusetts	Pilgrim Nuclear Power Station							No	No	616	0.003
25	Michigan	Donald C. Cook Nuclear Power Plant							No	Yes	430	0.0859***
26	Michigan	Fermi							No	No	1312	0.1874***
27	Michigan	Palisades Nuclear Plant										
28	Minnesota	Monticello Nuclear Generating Plant							No	Yes	456	0.157***
29	Minnesota	Prairie Island Nuclear Generating Plant							No	No	448	0.0406*
30	Mississippi	Grand Gulf Nuclear Station							Yes	No	89	0.2949***
31	Missouri	Callaway Plant							No	No	113	0.1448***
32	Nebraska	Cooper Nuclear Station							No	Yes	43	0.1637*
33	Nebraska	Fort Calhoun Station							No	Yes	282	0.0216
34	New Hampshire	Seabrook Station							No	No	828	0.1774***
35	New Jersey	Hope Creek Generating Station							No	No	418	0.1087***
36	New Jersey	Oyster Creek Nuclear Generating Station							No	No	602	0.1644***
37	New Jersey	Salem Nuclear Generating Station										
38	New York	Indian Point Nuclear Generating							No	No	4068	0.1452*
39	New York	James A. FitzPatrick Nuclear Power Plant							No	No	231	0.2047***
40	New York	Nine Mile Point Nuclear Station										
41	New York	R.E. Ginna Nuclear Power Plant							No	Yes	281	0.0799***
42	North Carolina	Brunswick Steam Electric Plant							No	Yes	129	0.1974***
43	North Carolina	McGuire Nuclear Station							No	Yes	420	0.2078***
44	North Carolina	Shearon Harris Nuclear Power Plant							No	Yes	519	0.0849***
45	Ohio	Davis-Besse Nuclear Power Station							No	No	156	0.1415***
46	Ohio	Perry Nuclear Power Plant							No	No	661	0.0441***
47	Pennsylvania	Beaver Valley Power Station							No	No	935	0.2191***
48	Pennsylvania	Limerick Generating Station							No	Yes	1314	0.177***
49	Pennsylvania	Peach Bottom Atomic Power Station							No	No	649	0.1676***
50	Pennsylvania	Susquehanna Steam Electric Station							No	No	319	0.1564*
51	Pennsylvania	Three Mile Island Nuclear Station							No	Yes	336	0.1966***
52	South Carolina	Catawba Nuclear Station							No	No	297	0.1011***
53	South Carolina	H. B. Robinson Steam Electric Plant							No	Yes	148	0.1295***
54	South Carolina	Oconee Nuclear Station							Yes	No	323	0.0841***
55	South Carolina	Virgil C. Summer Nuclear Station							No	No	222	0.229***
56	Tennessee	Sequoyah Nuclear Plant							No	Yes	190	0.0945*
57	Tennessee	Watts Bar Nuclear Plant							No	No	158	0.2375***
58	Texas	Comanche Peak Steam Electric Station							No	Yes	362	0.2605***
59	Texas	South Texas Project							No	No	60	0.0446
60	Vermont	Vermont Yankee Nuclear Power Plant							No	No	323	0.0315
61	Virginia	North Anna Power Station							No	No	394	0.3419***
62	Virginia	Surry Nuclear Power Station							No	Yes	501	0.18***
63	Washington	Columbia Generating Station							No	No	84	0.0568
64	Wisconsin	Kewaunee Power Station							No	Yes	189	0.1188*
65	Wisconsin	Point Beach Nuclear Plant										
		Total	3	1	5	21	4	8	8	30	27,220	
		Percent Total	5%	2%	8%	36%	7%	14%	14%	51%		

Note: Cluster 1: Index 13, 16 & 17; Cluster 2: Index 25 & 27; Cluster 3: Index 35 & 37; Cluster 4: Index 39 & 40; Cluster 5: Index 64 & 65
Green flag = statistically significant association at either the p< 0.1, p<0.05, p<0.01 or p<0.001 level; Red flag = otherwise

5.5 Implications for Environmental Justice

There are in the U.S. 104 nuclear reactors distributed across 65 NPPs. The observed association between host communities' distance from the NPP and select socio-demographic characteristics is able to explain the frequent locating of NPPs in low socio-economic status (SES) communities. In general, NPPs are sited in communities that boast a higher percent Black, percent Asian, percent Hispanic, and percent Color among their populations. This is true for all four regions expect the U.S. South, where communities with a higher percent Hispanic tend to be closely associated with NPPs.

Looking at individual NPPs and their host communities, approximately two thirds of all plants are located in communities that include a higher percent Black, percent Hispanic, percent Asian, or percent Color than the U.S. population at large, and about eight out of ten NPPs are located in communities with a low SES. Even after accounting for the spatial autocorrelation that exists between and among communities, more than half of all NPPs were seen to be sited in communities characterized by a low SES. This implies that the host communities face environmental justice issues because they are not afforded the same degree of protection from environmental and health hazards resulting from the NPP as are other communities. Second, to address the issue of unequal environmental protection in communities that, in total, account for more than 96 million people, is an enormous task that would require the input and support of all stakeholders.

5.6 Summary of Findings

In this chapter, I presented the findings of my OLS and SAR analyses in order to examine the statistical associations that exist, if any, between the dependent and independent variables. At the national, regional, and individual NPP levels, OLS

regression estimates revealed that certain racial/ethnic variables—namely, percent Color, percent Black, percent Asian and percent Hispanic—as well as certain socio-economic variables, including percent living below the federal poverty line, percent living in owner-occupied housing units and population density (LN), each showed a statistically significant association with the dependent variable distance (LN). In the U.S. West region, however, percent Hispanic, percent living below the federal poverty line and percent living in owner-occupied housing units did not show a statistically significant relationship with the dependent variable. The OLS regression estimates calculated using the spatial-weight matrix of queen-based contiguity provided high Moran's I coefficient values that were significantly different from zero, which suggests a violation of dependent-error terms and indicated the need to incorporate some form of SAR analysis into the current study.

The SAR analysis was conducted at the individual-NPP level. After taking spatial autocorrelation into account there was a decrease in the number of locations at which both racial/ethnic variables and socio-economic variables exhibited statistically significant associations with distance, as well as generally lower Moran's I values. This suggests the existence of spatial autocorrelation problems with regard to individual NPP sites.

Chapter 6

FINDINGS TO RESEARCH QUESTION 3

This chapter presents my findings pertaining to Research Question 3: What are the levels of potential risk associated with NPPs and with the socio-demographic characteristics of specific populations living within a 50-mile radius of a NPP? First, I discuss the potential risks associated with individual NPPs. Second, I present the socio-demographic characteristics of the populations living in host communities, sorted into four levels of potential risk—namely, low, moderate, high, and very high—which I will define in this chapter. Third, I discuss the trends that are evident in the demographics of these populations. Fourth, I discuss the environmental justice issues these populations face. Lastly, I summarize my findings.

6.1 NPP Potential Risk Index (NPP PRI)

My goal in this section is to construct a potential risk index (PRI), which is a composite index that can be applied to all U.S.-based NPPs. To achieve my goal, I have constructed a composite index that measures the potential risks of and associated with NPPs. According to the OECD (2008), "a composite indicator is formed when individual indicators are compiled into a single index on the basis of an underlying model of the multi-dimensional concept that is being measured" (OECD, 2008, p. 13). To construct the index, I followed a five-step process that included: (1) constructing a theoretical framework, (2) selecting data, (3) normalizing the data, (4) determining the weights to be assigned to the different categories and types of data, and (5) aggregating the data.

First, I established a conceptual framework that included the three cornerstone potential risks that confront any NPP—namely, plant operational risks, natural disaster risks, and plant locational risk (Figure 5). To begin with, the potential risks at a given NPP can stem from the plant itself—from its day-to-day operations, as a result of the normal aging of the plant and/or the continued, ongoing exposure of the plant, its equipment and its surroundings to radioactive effluents and their byproducts. Next, any NPP could experience an accident, including a core-damage event, which could be triggered by, for instance, a natural disaster such as an earthquake, hurricane or tornado. In addition, the plant's physical location, especially when near to densely populated areas, influences the level of the potential risk it poses. If a given plant is sited in proximity to a densely populated area such as a city, then said plant will be more prone to exposure to a human-caused hazard such as an airplane crash, terrorist attack, etc. The potential risk level of a given NPP can be measured across these three dimensions.

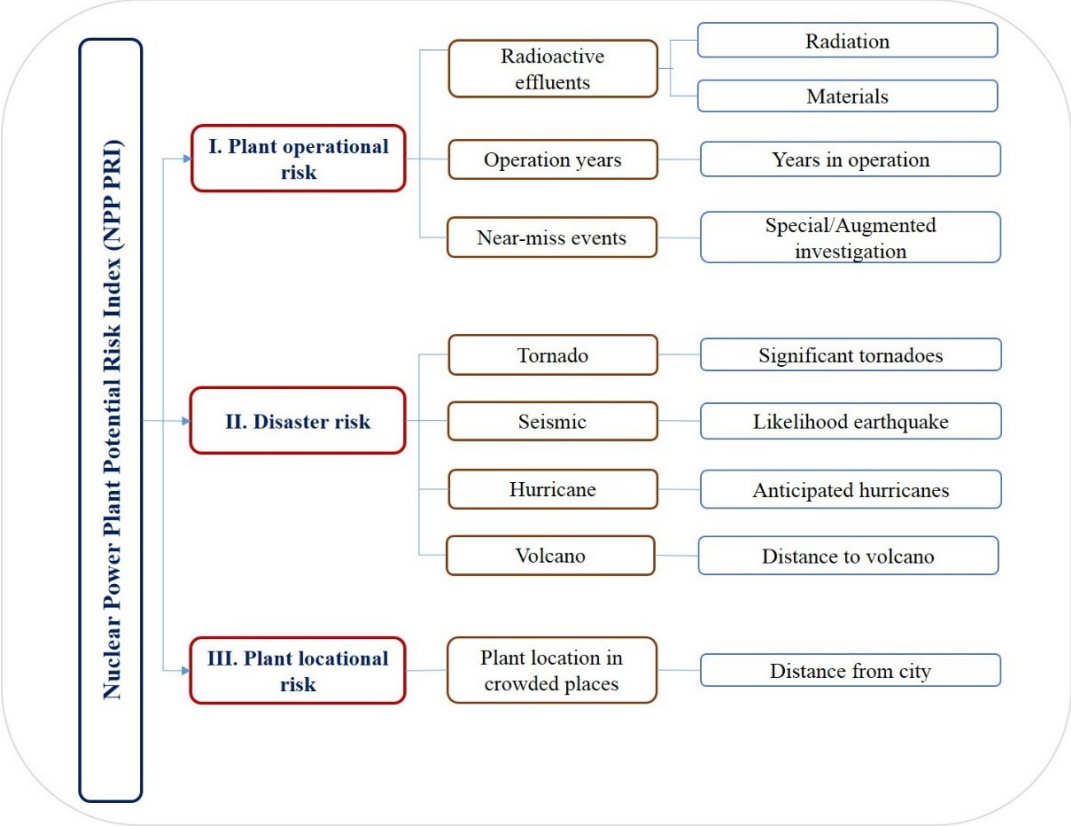


Figure 5. A conceptual framework used in constructing a PRI for U.S.-based NPPs.

Second, radioactive effluents are measured by the radioactive materials they are comprised of and the associated radiation doses those materials deliver or carry with them. Data for two types of radioactive effluents—namely, gaseous and liquid effluents—were summed to arrive at a total volume of radioactive effluents released for each NPP. The amount released was normalized according to the amount of electricity generated at each. The effective dose data computed using the normalized total radioactive effluents were then estimated using a dose estimate model established by the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) (Harris & Miller, 2008). These estimates were made using a model site for which it was assumed that, within 31 miles of the site, the population density was 1,036/square mile,

and within 772 miles of the site, the population density was 52/square mile. This model site provides us with an estimate of CED per unit release for different release categories. The CED per unit of electrical energy (man Sv (GW a)-1) then can be obtained by multiplying the normalized releases by the UNSCEAR-calculated values for CED per unit release. Both the radioactive effluents released and their effective dose data for the period 2001–2008 were included in these calculations, and were given equal weight in constructing the NPP PRI presented here (Appendix E, Table E.3).

Another type of data is near-miss events. The NRC typically reports on near-miss events at NPPs. These events are termed as such because they raise the risk of damage to the reactor core and endanger the safety of workers and the public (Lochbaum, 2012; Lochbaum, 2011; Lochbaum, 2010). Analysis of a given near-miss event will, depending on the potential risk level of the event, involve one of the NRC's three investigative teams—namely, the augmented inspection team (AIT), the incident inspection team (IIT), or the special inspection team (SIT). In the past three years, there have been reports of near-miss events issued by each of the first two teams. Known near-miss events that occurred in 2010, 2011 and 2012 were accounted for when constructing the NPP PRI (Appendix E, Table E.1).

According to the World Nuclear Association (2013), most NPPs are designed for a use life of 30–40 years. As this window is extended out, NPPs will face three problems. First, there are problems at aging plants with components and parts that need to be replaced, some of which are difficult to access. Second, there are issues with obsolescence, as many NPPs currently in operation still use analog instrument and control systems. Third, due to the heat and neutron irradiation, the plant's materials

degrade with age. In the U.S., more than 100 reactors are anticipated to be granted license extensions from 40 to 60 years. These extensions pose a safety risk and raise the issue of reliability at older NPPs. The age of the plant, or its duration of operation in years, can be computed by subtracting the year of issue of its commercial operating license from the current year. The longer a NPP has been in operation, the more likely that it may pose a risk. The age of the NPPs included in this study are listed in Appendix E (Table E.2).

A natural disaster such as an earthquake, hurricane or tornado may trigger a nuclear accident that can result in damage being done to the reactor core. First, the likelihood of an earthquake striking a given NPP was estimated with data taken from the U.S. Geologic Survey's (USGS) National Seismic Hazard Map, in which the severity of horizontal shaking expressed as a percentage of g—g being the acceleration of a falling object due to gravity—is displayed with five color-coded categories that denote "seismic design categories" (SDCs; (US GS, 2013), which correspond to the likelihood of an earthquake occurring that would lead to shaking and displacement of various intensities (US FEMA, 2013b). The five colors and the severity they denote are as follows: White refers to areas in which there is a very small probability of such a damaging earthquake occurring; Gray denotes that the area could experience shaking of moderate intensity; Yellow that the area could experience strong shaking; Brown that the area could experience very strong shaking; and, Red that the area is near to a major active fault, and thus refers to those areas that are likely, in the event of an earthquake, to experience the most intense shaking. The USGS map was overlaid on a map showing the locations of all 65 NPPs in the U.S. The output display was then used to assign each NPP a value, on a scale from 0 to 6, that corresponded to the five color categories, such that earthquake risk

is measured by the likelihood that an earthquake will occur on a scale ranging from 0 (least likely) to 6 (most likely). Second, hurricane risk was measured by taking into account the number of hurricanes predicted to make landfall near the site of a NPP in the century to come. Third, tornado risk was measured by considering the average number of significant tornadoes documented between 1921 and 1995 (Appendix E, Table E.2; (The Daily Beast, 2011). Fourth, volcano risk was measured by distance miles from the nearest volcano (Appendix E, Table E.2; (The Daily Beast, 2011). Finally, locational risk was measured by distance in miles from the nearest city (Appendix E, Table E.2; (The Daily Beast, 2011).

Third, I normalized selected study indicators in order to render them comparable to one another. The Min-Max method was used to create an identical range by transforming indicators to a scale that would allow for direct comparisons. The method called for the subtracting of the minimum value from the original value and then dividing by the range of the indicator values. In other words, each variable was rescaled, from 0 to 100, using the following formula: $\{c_i' = [(c_i - c_{min})/ (c_{max} - c_{min})] \times 100\}$ where c_i' = normalized or rescaled value; c_i = original value; c_{min} = minimum value in the variable; and c_{max} = maximum value in the variable (Tate, Cutter, & Berry, 2010; OECD, 2008).

Fourth, the construction of a composite index requires the application of appropriate weighting methods. I applied principal component analysis (PCA) and factor analysis (FA) methods to aid in selecting appropriate weights, which were then used to compile the selected study indicators into a single composite index. I began by conducting a PCA to extract factors. A FA analysis with *varimax* rotation was then performed in order to minimize sub-indicators that had a loading on the same factor,

which allowed me to study that subset of the principal components that accounted for the largest amount of variance. I selected four factors that were associated with eigenvalues larger than one; these were responsible for a cumulative contribution to the overall variance of 63.19% (Table 32). After that, I computed weights from the factor loading results. To do so, the weights first were normalized by the squared factor loading—for example, radiation dose in factor 4, of 0.863 loading, was normalized to 0.608, according to the formula (0.608=(0.863^2)/1.2238). After normalizing the factor loadings, the immediate composite weights were obtained. Following the method Nicoletti, Scarpetta, & Boylaud (2000) prescribe, I grouped the four sub-indicators with the highest factor loadings into four composite indicators: sub-indicator 1 includes significant tornados (with a weight of 0.197), likelihood of earthquake (weight = 0.348), and distance from volcano (weight = 0.383); sub-indicator 2 includes radioactive effluents (weight = 0.398), years in operation (weight = 0.359), and near-miss events (weight = 0.040); sub-indicator 3 includes anticipated hurricanes (weight = 0.508) and plant location distance from city (weight = 0.267); and, sub-indicator 4 includes radiation dose (weight = 0.863). Next, each of the four immediate sub-indicators was aggregated by applying the weight of the proportion of the explained variance in the dataset: 0.2853 for sub-indicator 1 (0.2853=1.6222/(1.62+1.47+1.37+1.22)), 0.2579 for sub-indicator 2, 0.2416 for sub-indicator 3, and 0.2152 for sub-indicator 4. In other words, the NPP PRI was obtained via the following equation: NPP PRI= (0.2853*sub-indicator 1+ 0.2579*sub-indicator 2+ 0.2416*sub-indicator 3+ 0.2152*sub-indicator 4).

Table 32
Factor loadings of the NPP PRI using Varimax method

	Factor loadings				Normalized factor loadings			
Variable	Factor1	Factor2	Factor3	Factor4	Factor1	Factor2	Factor3	Factor4
Radiation Dose	-0.010	0.096	-0.068	0.863	0.000	0.006	0.003	0.608
Radioactive Effluents	-0.121	0.764	0.087	0.306	0.009	0.398	0.006	0.077
Years in Operations	-0.282	-0.725	0.112	0.186	0.049	0.359	0.009	0.028
Near-miss Events	0.068	0.242	0.189	-0.116	0.003	0.040	0.026	0.011
Significant Tornados	-0.565	0.348	0.477	-0.330	0.197	0.083	0.166	0.089
Likelihood of Earthquake	0.751	0.186	0.097	0.020	0.348	0.024	0.007	0.000
Anticipated Hurricanes	-0.131	-0.055	-0.835	0.117	0.011	0.002	0.508	0.011
Plant location distance from city	-0.026	-0.360	0.605	0.448	0.000	0.088	0.267	0.164
Distance from Volcano	0.789	0.015	0.112	-0.121	0.383	0.000	0.009	0.012
Eigenvalues	1.6222	1.4668	1.3742	1.2238				
Explain. Var. /Total	0.2853	0.2579	0.2416	0.2152				

To understand the relative risk levels that exist among the 65 NPPs operating in the U.S., the composite index scores were ranked from highest to lowest. I grouped them into four categories based on their percentile rank: (1) low risk, between 0 and 25th percentile; (2) moderate risk, between >25th and 50th percentile; (3) high risk, between >50th and 75th percentile; and, (4) very high risk, between >75th and 100th percentile. There are 16 plants in each of the categories low risk, moderate risk and high risk, and 17 in the category very high risk (Table 33 and Figure 6).

Table 33

PRI and PRI Categories for U.S.-based NPPs

Index	State	Plant Name	Nuclear Power Plant Potential Risk Index (NPP PRI)	Risk Category
7	Connecticut	Millstone Power Station	42.49	Very high risk
42	North Carolina	Brunswick Steam Electric Plant	32.17	Very high risk
2	Alabama	Joseph M. Farley Nuclear Plant	28.20	Very high risk
62	Virginia	Surry Nuclear Power Station	26.87	Very high risk
5	California	Diablo Canyon Nuclear Power Plant	26.63	Very high risk
11	Georgia	Edwin I. Hatch Nuclear Plant	26.14	Very high risk
54	South Carolina	H. B. Robinson Steam Electric Plant	25.95	Very high risk
10	Florida	Turkey Point Nuclear Generating	25.84	Very high risk
22	Louisiana	Waterford Steam Electric Station	25.76	Very high risk
53	South Carolina	Oconee Nuclear Station	25.67	Very high risk
12	Georgia	Vogtle Electric Generating Plant	25.54	Very high risk
9	Florida	St. Lucie Plant	24.66	Very high risk
60	Vermont	Vermont Yankee Nuclear Power Plant	24.56	Very high risk
55	South Carolina	Virgil C. Summer Nuclear Station	24.47	Very high risk
17	Illinois	LaSalle County Station	24.45	Very high risk
49	Pennsylvania	Peach Bottom Atomic Power Station	24.42	Very high risk
30	Mississippi	Grand Gulf Nuclear Station	23.76	Very high risk
43	North Carolina	McGuire Nuclear Station	23.71	High risk
4	Arkansas	Arkansas Nuclear One	23.67	High risk
63	Washington	Columbia Generating Station	23.62	High risk
37	New Jersey	Salem Nuclear Generating Station	23.24	High risk
24	Massachusetts	Pilgrim Nuclear Power Station	23.10	High risk
23	Maryland	Calvert Cliffs Nuclear Power Plant	22.90	High risk
61	Virginia	North Anna Power Station	22.76	High risk
51	Pennsylvania	Three Mile Island Nuclear Station	22.68	High risk
40	New York	Indian Point Nuclear Generating	22.18	High risk
56	Tennessee	Sequoyah Nuclear Plant	21.93	High risk
6	California	San Onofre Nuclear Generating Station	21.87	High risk
33	Nebraska	Fort Calhoun Station	21.70	High risk
21	Louisiana	River Bend Station	21.69	High risk
52	South Carolina	Catawba Nuclear Station	21.49	High risk
31	Missouri	Callaway Plant	21.33	High risk
44	North Carolina	Shearon Harris Nuclear Power Plant	20.94	High risk
8	Florida	Crystal River Nuclear Generating Plant	20.51	Moderate risk
58	Texas	Comanche Peak Steam Electric Station	20.29	Moderate risk
25	Michigan	Donald C. Cook Nuclear Power Plant	20.23	Moderate risk
20	Kansas	Wolf Creek Generating Station	20.10	Moderate risk
16	Illinois	Dresden Nuclear Power Station	19.73	Moderate risk
1	Alabama	Browns Ferry Nuclear Plant	19.66	Moderate risk
27	Michigan	Palisades Nuclear Plant	19.45	Moderate risk
34	New Hampshire	Seabrook Station	18.98	Moderate risk
14	Illinois	Byron Station	18.60	Moderate risk
48	Pennsylvania	Limerick Generating Station	18.52	Moderate risk
39	New York	R.E. Ginna Nuclear Power Plant	18.47	Moderate risk
59	Texas	South Texas Project	18.40	Moderate risk
36	New Jersey	Oyster Creek Nuclear Generating Station	18.36	Moderate risk
18	Illinois	Quad Cities Nuclear Power Station	18.27	Moderate risk
28	Minnesota	Monticello Nuclear Generating Plant	18.20	Moderate risk
45	Ohio	Davis-Besse Nuclear Power Station	17.91	Moderate risk
38	New York	James A. FitzPatrick Nuclear Power Plant	17.69	Low risk
47	Pennsylvania	Beaver Valley Power Station	17.52	Low risk
3	Arizona	Palo Verde Nuclear Generating Station	17.38	Low risk
65	Wisconsin	Point Beach Nuclear Plant	17.34	Low risk
35	New Jersey	Hope Creek Generating Station	17.26	Low risk
41	New York	Nine Mile Point Nuclear Station	17.21	Low risk
57	Tennessee	Watts Bar Nuclear Plant	16.99	Low risk
32	Nebraska	Cooper Nuclear Station	16.84	Low risk
19	Iowa	Duane Arnold Energy Center	16.82	Low risk
13	Illinois	Braidwood Station	16.07	Low risk
29	Minnesota	Prairie Island Nuclear Generating Plant	15.70	Low risk
64	Wisconsin	Kewaunee Power Station	14.95	Low risk
50	Pennsylvania	Susquehanna Steam Electric Station	14.22	Low risk
15	Illinois	Clinton Power Station	13.67	Low risk
46	Ohio	Perry Nuclear Power Plant	11.64	Low risk
26	Michigan	Fermi	11.50	Low risk

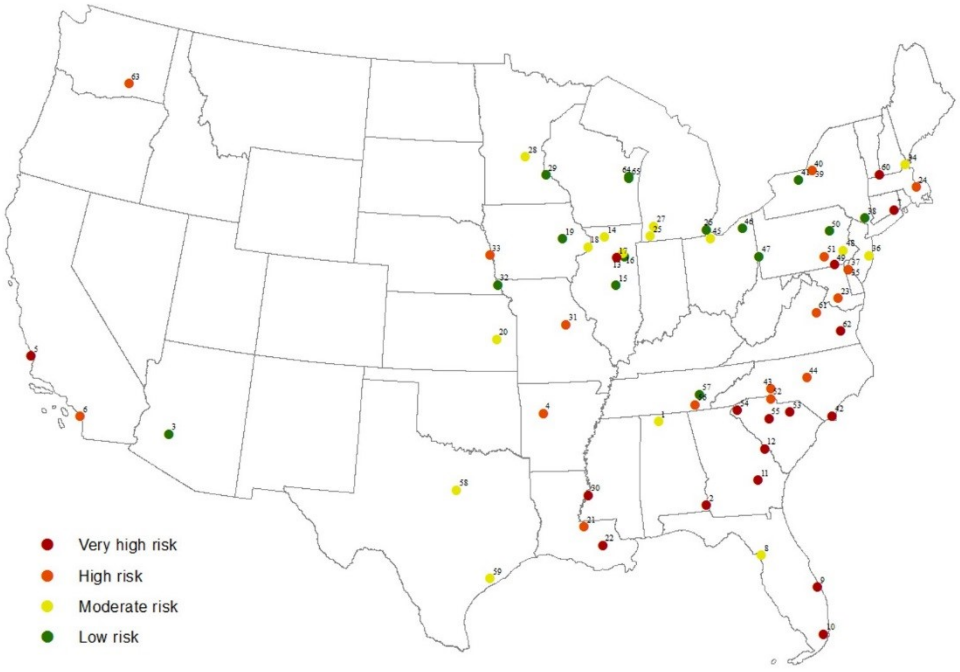


Figure 6. Distribution of NPP-related potential risk in the U.S.

6.2 The Socio-Demographic Composition of Populations according to NPP PRI Level

The 17 NPPs classified as very high risk accounted for the largest geographic area, some 83,640 square miles, or 28% of the total land area occupied by NPPs in the U.S. The highest percent Black (22%) among potentially at-risk populations was found in the host communities of NPPs sorted into this subgroup. The second largest area, 74,961 square miles or 25% of the total area occupied by NPPs in the U.S., was associated with the 16 NPPs assigned to the high risk category of the PRI as of 2010 (Table 34 and Figure 7). Because the census-tract boundaries for prior-year data were normalized to the 2010 census-tract boundaries, these areas do not change when analyzing U.S. Census data for the years 1990 and 2000 (Appendix A Table A.3).

The at-risk populations included a greater percent Asian, percent Hispanic, percent Native American, percent Other and percent Color than compared to their counterpart populations living in communities outside of the areas prone to nuclear power-related risks for each of the four PRI categories (Table 34). Populations living in close proximity to a NPP classified as low risk registered the highest percent unemployed and the highest percent living in renter-occupied housing units. Similar patterns were identified in the 1990 and 2000 U.S. Census data (Figure 7).

In addition to the highest percent Black (22.34%) occurring among the host communities of NPPs classified as being at very high risk, these same NPPs were also associated with the highest percent Color (42.60%) (Table 34). Similar patterns were observed in the data from 1990 and 2000 (Figure 7).

Table 34

Demographic Characteristics of Populations Living within a 50-mile Radius of a NPP, Classified according to Four PRI Categories using 2010 U.S. Census Data

2010	Low risk	Moderate risk	High risk	Very high risk	Total	Outside
Tracts	8,445	5,659	4,966	4,325	23,395	49,662
Tract area (sq. mile)	71,490	70,709	74,961	83,640	300,801	3,495,942
Total population	31,989,280	24,130,408	22,277,072	17,674,888	96,071,648	207,893,616
White	21,626,292	18,518,612	15,479,203	12,423,962	68,048,072	156,847,632
Black	5,402,879	2,861,589	3,268,325	3,949,417	15,482,210	22,496,542
Asian	2,036,120	1,041,474	1,398,483	399,936	4,876,013	9,801,153
Native American	109,554	67,366	95,330	60,454	332,704	2,147,761
Other	2,814,435	1,641,369	2,035,730	841,119	7,332,653	16,600,536
Hispanic	4,772,429	2,803,678	3,462,599	2,949,929	13,988,635	33,738,896
Color	12,612,146	7,067,641	8,591,788	7,529,264	35,800,840	71,591,664
White (%)	67.60	76.74	69.48	70.29	70.83	75.45
Black (%)	16.89	11.86	14.67	22.34	16.12	10.82
Asian (%)	6.37	4.32	6.28	2.26	5.08	4.71
Native American (%)	0.34	0.28	0.43	0.34	0.35	1.03
Other (%)	8.80	6.80	9.14	4.76	7.63	7.99
Hispanic (%)	14.92	11.62	15.54	16.69	14.56	16.23
Color (%)	39.43	29.29	38.57	42.60	37.26	34.44
Renter-occupied housing units (%)	36.28	26.38	29.32	28.18	30.69	28.73
College degree or higher (%)	31.44	30.66	30.49	26.07	30.03	26.9
Unemployed (%)	8.37	7.97	7.79	8.13	8.09	7.84
Below Poverty Line (%)	13.97	11.56	11.47	14.09	12.81	14.28
Mean household income ($)	77,805	77,145	78,260	67,522	75,845	68,593

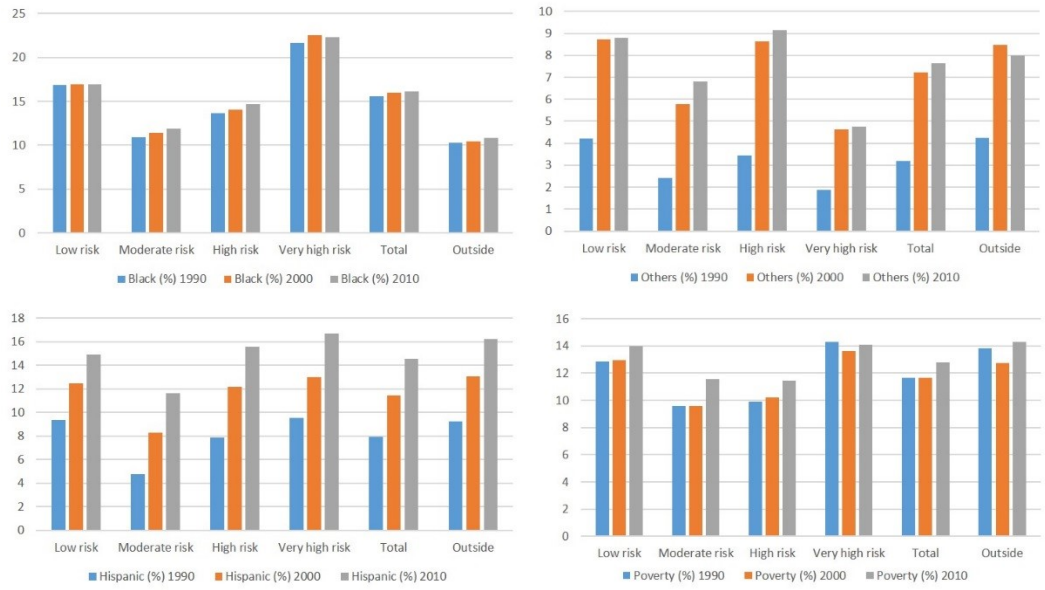


Figure 7. Demographic characteristics of populations living within a 50-mile radius of a NPP, as sorted by NPP PRI categories in 1990, 2000, and 2010.

6.3 Demographic Trends by PRI Category

I also examined the changes over time in the demographics of the populations associated with each of the four PRI categories across two periods—1990–2000, and 2000–2010. Between 2000 and 2010, percent Asian showed the greatest increase, up 48% in areas classified as moderate risk; in those same areas, meanwhile, percent people living below the federal poverty line increased 1.97 percent points (Table 35 and Figure 8). Percent Hispanic and percent Black registered the most pronounced increases, 44% and 17%, respectively, in areas classified as high risk. Overall, percent Color showed the greatest increase in the high risk category, up 54% and 30%, respectively, in 1990–2000 and 2000–2010.

Table 35

Changes in Demographic Characteristics of Populations Living within a 50-mile Radius of a NPP, Classified according to Four PRI Categories using 2010 U.S. Census Data

Percent Change	Low risk	Moderate risk	High risk	Very high risk	Total	Outside	Year on year
Asian	59%	71%	62%	45%	61%	40%	1990-2000
Asian	35%	48%	46%	44%	41%	38%	2000-2010
Black	7%	15%	21%	16%	13%	16%	1990-2000
Black	2%	10%	17%	6%	7%	13%	2000-2010
Color	33%	50%	54%	33%	40%	46%	1990-2000
Color	12%	28%	30%	17%	20%	25%	2000-2010
Hispanic	42%	92%	80%	52%	59%	62%	1990-2000
Hispanic	22%	49%	44%	37%	35%	36%	2000-2010
Native American	28%	20%	33%	31%	28%	20%	1990-2000
Native American	-6%	-11%	-6%	-4%	-7%	3%	2000-2010
Other	120%	161%	193%	174%	150%	128%	1990-2000
Other	3%	25%	19%	9%	12%	3%	2000-2010
Below Poverty Line (%)	0.13	0.01	0.35	-0.67	-0.03	-1.10	1990-2000
Below Poverty Line (%)	1.00	1.97	1.25	0.45	1.17	1.55	2000-2010

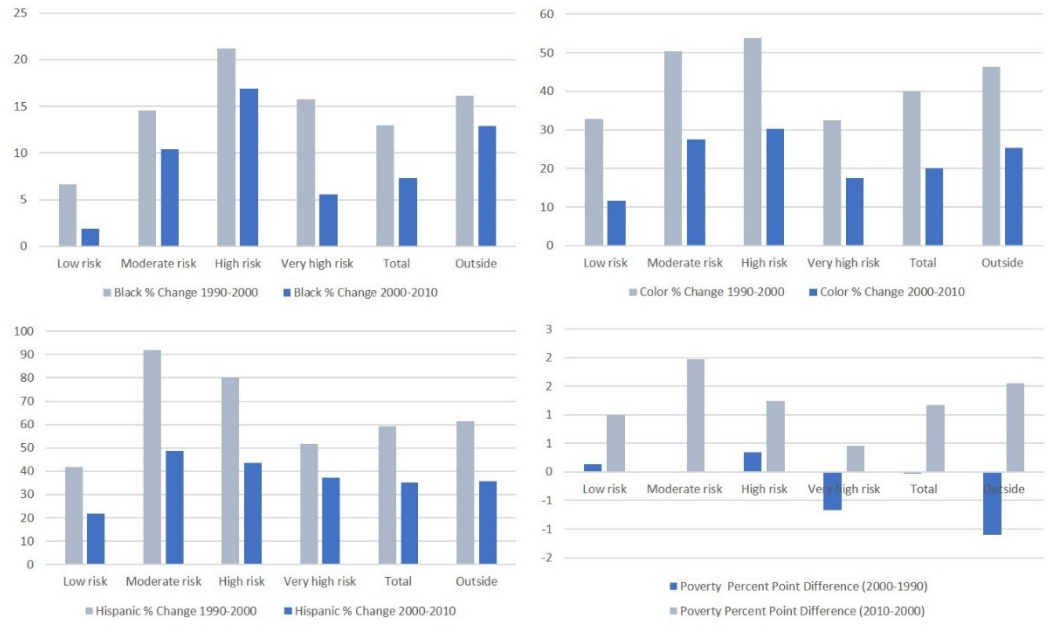


Figure 8. Changes in demographic characteristics of populations living in host communities of NPPs falling into different PRI levels.

6.4 Implications for Environmental Justice

This analysis has provided one potential means of quantifying the level of potential risk associated with a given NPP and has investigated the disparities that exist in the socio-demographic characteristics of the populations that are exposed to different levels of risk. I found a pattern such that populations living in areas associated with the

greatest amount of potential risk tended to include a higher percentage of minorities than did the average host community regardless of PRI category as of 1990, 2000 and 2010. This implies that among the at-risk population, different groups of people face different levels of risk associated with or attributable to NPPs. This indicates that there are two layers of environmental justice issues. One layer of environmental justice issues involves those people living in host communities that are within a 50-mile radius of a NPP, who face environmental justice issues deriving from the potential risks associated with the NPP and is made evident when comparing these groups with their counterparts that live outside of those areas. The second layer of environmental justice issues is that, among the populations of the host communities, certain groups—or entire populations at certain NPPs—are exposed to different levels of potential risk, classified here as low risk, moderate risk, high risk, and very high risk, depending on the unique circumstances and location of the individual NPP.

In addition, when I considered the socio-demographic trends over that same time frame, I found that the largest percent changes had occurred in the percent Hispanic and percent Black in the high-risk category. As a percent, the host community population living in moderate risk areas increased during the study period 1990–2010. This implies that the environmental justice issues are on-going and have been in existence for at least three decades. The long-term presence of environmental justice issues facing the NPP host communities, coupled with the large size of such communities—estimated to be more than one third of the total U.S. population—presents enormous challenges to all stakeholders seeking to address issues of environmental justice.

6.5 Summary

In this chapter, I constructed a PRI for the 65 U.S.-based commercial NPPs so that I could order these sites by the potential risk level they pose to their surrounding populations. Four risk levels were defined—namely, low risk, moderate risk, high risk, and very high risk. I examined any discrepancies that existed in the socio-demographic characteristics of the host communities' populations as sorted by risk-level category and found that a greater percentage of minority groups were exposed to the highest levels of risk. In addition, percent Hispanic and percent Other showed the greatest percent change in both the period 1900–2000 and 2000–2010.

Chapter 7

FINDINGS TO RESEARCH QUESTION 4

This chapter presents my findings pertaining to Research Question 4: Is there any association between exposure to radioactive effluents and the socio-demographic characteristics of populations based on a simulated core-damage accident at a single NPP? First, I assessed the aftereffects of a PWR core-damage accident at a select NPP under four unique scenarios: (1) a projection of core damage with meteorological data representing quarter 1 (January to March); (2) a projection of core damage with meteorological data representing quarter 2 (April to June); (3) a projection of core damage with meteorological data representing quarter 3 (July to September); and (4) a projection of core damage with meteorological data representing quarter 4 (October to December). Second, I identified an association between the socio-demographic characteristics of the populations that were exposed to radioactive effluents as a result of the dispersal of the radioactive plume path under quarter 1 meteorological conditions. Third, I identified an association between the socio-demographic characteristics of the populations exposed to radioactive effluents dispersed under meteorological conditions typifying quarter 2. Fourth, I identified an association between the socio-demographic characteristics of populations exposed to radioactive effluents dispersed under meteorological conditions typifying quarter 3. Fifth, I identified an association between the socio-demographic characteristics of the populations exposed to radioactive effluents dispersed under meteorological conditions typifying quarter 4. Sixth, I discuss limitations of the dose projections with RASCAL program. Seventh, I assess the relevance of my

findings in regard to issues of environmental justice. Finally, I summarize my findings as they pertain to Research Question 4.

7.1 Pressurized Water Reactor (PWR) Core-Damage Accident

To investigate Research Question 4, I selected a single NPP—namely, Palo Verde Nuclear Generating Plant, Arizona—and assessed the simulated dispersal of a radioactive effluent plume path in a scenario in which just one of the NPP's three PWRs experienced a core-damage accident. To accurately project and assess the source term dose and release pathway, I used the Radiological Assessment System for Consequence Analysis (RASCAL) Source Term to Dose (STDose) model (RSICC, 2013). The computer program was preinstalled with information on the type of reactor, the reactor's power output capacity, peak rod burn in the reactor, the discharge burn-up projected to occur in materials housed in spent fuel storage, and so on. However, the meteorological information, such as that on wind direction and speed, stability class, precipitation, and air temperature must be entered manually. The RASCAL 4.3 program's method of calculating the source term is based on the methods documented in McKenna and Glitter (1988). The inhalation dose factors used in my calculations are based on the recommendations of the International Commission on Radiological Protection (ICRP, 1977). Radiation dose was computed as a total effective dose equivalent (TEDE), which is defined as "the sum of the deep-dose equivalent (EDE) (for external exposures) and the committed effective dose equivalent (CEDE) (for internal exposures)" (US NRC, 2011b).

During a core-damage accident, the dispersion path of the resultant plume is largely dependent on the prevailing weather conditions, including wind direction

(degree), speed (miles per hour), stability class, precipitation and air temperature (degrees F). The projection of a plume path originating at Palo Verde NPP was performed using four discrete meteorological datasets, representing four calendric quarters. Data were obtained from the meteorology joint frequency distribution table (Kutner, 2010) Figs E.1–E.4). The four projected plume paths included a TEDE measured across a grid composed of 5 mile x 5 mile squares overlaid around each receptor. The RASCAL program uses a Lagrangian puff model that includes a uniformly-spaced Cartesian grid of 41 x 41 receptor points with the release point always at the center. There are four distance options available for selection—10, 25, 50, and 100 miles—ahead of projecting a plume's path of dispersion; however, the resolution of the Cartesian grid decreases as the distance selected increases. For example, when selecting 10 miles as the calculation distance, the distance between receptor points is 0.5 miles, whereas with 100 miles as the calculation distance there is a distance of 5 miles between Cartesian grid receptors. The dispersion of the plume from one receptor to another is a function of time elapsed since release, wind speed, atmospheric stability, and surface roughness. The results of the dispersal projections were imported, in shapefile format, to ENVI's ArcMap program (US NRC, 2013g). The resulting TEDE is measured in Roentgen equivalent man (rem) and is equal to the absorbed dose (in rads) multiplied by the quality factor of the type of radiation (US NRC, 2011b).

To study the association between TEDE and the socio-demographic characteristics of the populations living in the path of the plume, I overlaid the plume as one layer on top of a separate census-tract layer and apportioned the socio-demographic characteristics associated with each impacted grid square.

To understand the association, if any, between radioactive effluents and the soio-demographic characteristics of the populations that would be exposed to radioactive emissions, I conducted OLS regression analyses (multivariate analysis) for the data resulting from each of the four plume dispersal simulations. I considered the associations, if any, between a dependent variable—the natural log of TEDE—and a set of independent variables: percent Color, percent Black, percent Asian, percent Hispanic, percent living below the federal poverty line, population density (LN) and percent living in owner-occupied housing units.

In the subsequent sections, I will discuss my statistical findings in regard to the analyses performed on the data generated by each of the four plume path dispersal simulations. First, I present data describing the socio-demographic characteristics of the populations exposed to radioactive effluents, sorted by TEDE category. Second, I describe the findings from my OLS regression analyses that compared the TEDE (LN) to the present study's independent variables.

7.2 Projected Plume Path for Quarter 1

First, I projected the plume dispersion path that would occur in a scenario in which the Palo Verde NPP experienced a core-damage accident under meteorological conditions typifying quarter 1. The projection was performed with a prevailing wind direction of west-northwest, at a speed of 6.2 miles per hour. Under these conditions, the plume dispersed to the east-southeast, covering a distance greater than 100 miles in a 24-hour period (Figures 9 and 10). Table 36 displays the demographic characteristics of the impacted populations, sorted by TEDE categories. The plume footprint is estimated to have covered an area of approximately 3,477 square miles, dispersing over an estimated

population of 663,543. The estimated TEDEs in the plume ranged from 0.000 to 0.095 rem which is below the recommended evaluation dose level of 1 rem. Guidelines for evacuation, sheltering and the administration of stable iodine are explained in the *Manual of protective action guides (PAGs) and protective action for nuclear incidents* (US EPA, 1992a). A TEDE between 1 and 5 rem is sufficient to warrant recommending evacuation and sheltering, while a TEDE of 25 rem is a benchmark for the administering of stable iodine, with the approval of state medical officials. In practice, the NRC urges RASCAL users to exercise caution when interpreting projection results, as they must also be validated with a field air sample at the centerline during plume passage; the data usually are collected by field teams in a 10- or 15-minute window after the plume path has passed (US NRC, 2013g).

Among the population exposed to the radioactive plume in this simulation, the percent Black and percent Asian were higher than those same percentages among the counterpart populations living in areas outside of the plume footprint. However, fewer people living beneath the path of the plume were living below the federal poverty line than compared with the counterpart population living outside of the plume's footprint.

Second, to conduct an OLS regression analysis, I sought out the correlations that existed, if any, between TEDE (LN) and the seven independent variables described above (Table 38). Population density (LN), 0.54, and percent Asian, 0.89, showed larger correlation coefficients, respectively, while other variables exhibited only minimal correlation (Table 37). The percent living below the federal poverty line and percent Color variables showed positive correlation coefficients, which implies that poor and minority people would be disproportionately exposed to high radiation doses as a result

of the release and dispersal of a radioactive plume from Palo Verde NPP during calendar quarter 1.

Descriptive statistics pertaining to the study variables are provided in Table 43. This OLS analysis omitted missing values—when TEDE zero values were converted to LN values, they were manually recorded as missing values—leaving 489 census tracts to be considered. A total of 660,000 people out of a total population in the state of Arizona of approximately 6 million people were exposed to the projected plume path. Among the exposed population, two groups were represented in percentages greater than their percent composition of Arizona's population, in general—percent Black, 4.89% in the areas beneath the projected plume path versus 3.73% outside of the plume path; and, percent Asian, 5.03% versus 2.60%. The plume's footpath covered the cities of namely Buckeye, Goodyear, Maricopa, Casa Grande, Eloy, Florence, Gilbert, Chandler, Tempe, Guadalupe, Queen Creek, Coolidge, and Marana (Figures 9 and 10). The higher TEDEs are shown in red (Figure 9) and were primarily observed in the cities of Buckeye, Goodyear, Maricopa, Florence, Coolidge, and Casa Grande (Figure 10).

In models 1 and 3, both of which test the influence of variables that describe minority-status of subgroups of Arizona's population such as percent Black, percent Hispanic and percent Color showed statistically significant relationships (Table 39). This implies that the presence of minorities, including Black, Hispanic and Color, can explain the dose levels to which populations living beneath the projected plume footprint would be exposed. In other words, the census tracts that include a higher percent of these racial/ethnic subgroups as compared to surrounding census tracts were exposed to higher doses of radioactivity due to their being located in the path of plume. In models 2 and 4,

both of which test the influence of both minorities and SES indicators—including population density, percent living below the federal poverty line and percent living in renter-occupied vs. owner-occupied housing units—percent Color, percent Black and percent Asian each showed a statistically significant relationship with study dependent variable of TEDE.

In short, in the event of a core-damage accident at Palo Verde NPP during meteorological conditions typifying Quarter 1, minorities—including Color, Black and Asian populations—most of whom live in owner-occupied housing units, would likely be exposed to high doses of radiation.

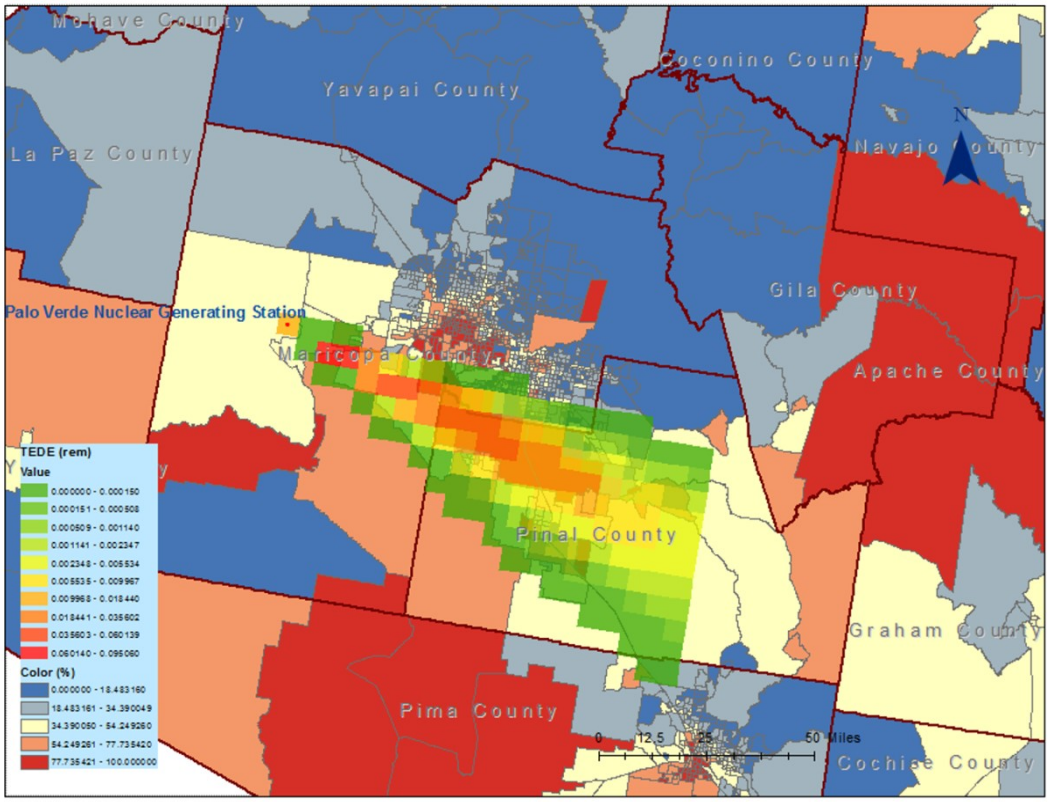


Figure 9. The projected plume path emanating from Palo Verde NPP after a simulated core-damage accident conducted under meteorological conditions typifying Quarter 1.

Figure 10. The projected plume path emanating from Palo Verde NPP after a simulated core-damage accident conducted under meteorological conditions typifying Quarter 1 overlaid on satellite imagery obtained through Google Earth.

Table 36

Demographic Composition in Areas around Palo Verde NPP located beneath the Projected Plume Path with Meteorological Conditions Typifying Quarter 1

Demographics/(TEDE rem)	(0.000-0.0003)	(0.0003-0.002)	(0.002-0.005)	(0.005-0.01)	(0.01-0.4)	Total	Outside
Tracts	213	145	50	73	68	549	977
Tract area (sq. miles)	1,201	726	425	475	650	3,477	110,513
Total population	305,529	207,069	41,606	75,125	34,214	663,543	5,583,273
White	235,302	157,724	31,010	57,221	21,834	503,090	4,380,516
Black	16,143	9,151	2,337	3,266	1,574	32,471	208,184
Asian	16,948	12,539	1,094	2,214	581	33,375	145,326
Native American	6,267	4,629	1,855	4,149	7,049	23,949	254,387
Others	30,870	23,025	5,310	8,276	3,177	70,658	594,860
Hispanic	66,773	45,665	10,932	18,591	6,745	148,705	1,665,969
Color	110,872	75,803	16,869	29,130	16,337	249,011	2,330,774
White (%)	77.01	76.17	74.53	76.17	63.82	75.82	78.46
Black (%)	5.28	4.42	5.62	4.35	4.60	4.89	3.73
Asian (%)	5.55	6.06	2.63	2.95	1.70	5.03	2.60
Native American (%)	2.05	2.24	4.46	5.52	20.60	3.61	4.56
Others (%)	10.10	11.12	12.76	11.02	9.29	10.65	10.65
Hispanic (%)	21.85	22.05	26.27	24.75	19.71	22.41	29.84
Color (%)	36.29	36.61	40.55	38.77	47.75	37.53	41.75
Renter-occupied housing units (%)	26.70	20.73	15.66	16.42	18.38	22.57	27.81
College degree or higher (%)	37.20	34.26	19.32	23.37	18.08	32.43	25.60
Unemployed (%)	6.18	6.25	6.28	8.07	8.08	6.47	7.80
Below Poverty Line (%)	8.95	7.00	8.90	10.68	15.65	8.86	16.01
Mean household income ($)	86,360	85,695	80,214	69,205	59,475	82,421	65,767

Table 37

Pearson Correlation Coefficients between TEDE (LN) and Independent Variables of the Populations in the Projected Plume Path Emanating from Palo Verde NPP during a Core-Meltdown Accident during Quarter 1

	rho	P	count
Population Density (LN)	-0.0278	0.5400	489
Black (%)	-0.1337	0.0031	489
Asian (%)	-0.0064	0.8874	489
Hispanic (%)	-0.0868	0.0551	489
Color (%)	0.1598	0.0004	489
Below Poverty Line (%)	0.0726	0.1089	489
Owner-Occupied Housing Units (%)	-0.1399	0.0019	489
Observations	548		

Table 38

Descriptive Statistics for Study Variables of the Population in the Projected Plume Path Emanating from Palo Verde NPP during a Core-Meltdown Accident during Quarter 1

	Mean	SD	Min	Max
TEDE (LN)	-8.295	4.211	-18.421	-2.353
Population Density (LN)	4.921	2.480	0.597	8.976
Black (%)	4.667	6.489	0.000	55.172
Asian (%)	3.924	5.972	0.000	30.054
Hispanic (%)	25.158	17.111	0.000	90.093
Color (%)	46.694	23.509	2.778	99.404
Below Poverty Line (%)	15.982	17.633	0.000	78.182
Owner-Occupied Housing Units (%)	64.457	14.848	0.000	100.000
Observations	489			

Table 39

Results of Logistic (Ordinary Least Square) Regression Analysis between TEDE (LN) and Independent Variables in Areas beneath the Projected Plume Path during Quarter 1

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0849**	-0.0736*
			(-2.917)	(-2.494)
Asian (%)			-0.0269	-0.0071
			(-0.800)	(-0.202)
Hispanic (%)			-0.0246*	-0.0254*
			(-2.088)	(-2.157)
Color (%)	0.0312***	0.0318*		
	(3.603)	(2.555)		
Population Density (LN)	0.0646	0.0108	-0.0586	-0.0244
	(0.787)	(0.123)	(-0.764)	(-0.277)
Below Poverty Line (%)		-0.0182		0.0086
		(-1.138)		(0.627)
Owner-Occupied Housing Units (%)		-0.0218		-0.0331*
		(-1.459)		(-2.384)
Constant	-10.0696***	-8.1363***	-6.8869***	-5.1669***
	(-14.453)	(-5.558)	(-11.832)	(-4.061)
Observations	489	489	489	489
R-squared	0.027	0.033	0.027	0.044
F	6.6850	4.1765	3.4031	3.6555
Log-likelihood	-1389.7654	-1388.1038	-1389.6193	-1385.5206
Akaike Info Coefficient	2785.5307	2786.2077	2789.2385	2785.0413

t statistics in parentheses

+ p<0.10, *p<0.05, **p<0.01, ***p<0.001

7.3 Projected Plume Path for Quarter 2

This projection exercise depicts, first, the effects of a core-damage accident under meteorological conditions typifying quarter 2. The prevailing wind direction at that time is from the southwest (225 degrees), which would carry the plume in a northeasterly direction at a speed of 7.6 miles per hour. I estimate that approximately 1 million people (964,774) would be exposed to radiation, the result of a plume large enough to cover an area of 6,004 square miles within 24 hours (Table 40). The estimated TEDE in the impacted areas is between 0.00 and 0.023 rem, which is below the 1 rem called for in order to initiate either evacuation or sheltering according to the NRC's protection action guidelines. Again, this estimated TEDE would need to be validated with field data collected at the time of the accident. The population living beneath this projected plume footprint is predominantly White (85%) and Hispanic (18%); in addition, only a small component of the effected population (8%) are living in poverty, a much smaller percentage than compared to their counterparts living outside of the plume's footprint but in Arizona (16%).

Second, I examined the correlations, if any, between the dependent and independent variables (Table 41). The only study variable that showed a positive correlation with the dependent variable was percent living below the federal poverty line, indicating that poorer people would be exposed to higher dose levels of radioactive effluents according to this projection of a plume path. The summary descriptive statistics for the 739 census tracts impacted by the accident are depicted in Table 48. The impacted areas include Buckeye, Glendale, Litchfield Park, Surprise, Peoria, Carefree, Payson, Camp Verde, Star Valley, and Sedona (Figures 11 and 12). The areas exposed to higher

doses of TEDE are shown in red (Figure 11) and tend to associate with the cities of Buckeye, Glendale, Litchfield Park, Surprise, Peoria, and Carefree (Figure 12).

In models 1 and 3, percent Color and percent Hispanic, as well as the natural log of population density, each show a statistically significant association with the dependent variable. In models 2 and 4, in addition to the three significant variables identified in models 1 and 3, percent Black and percent living in owner-occupied housing units showed a significant statistical association with the dependent variable (Table 43).

In short, if the Palo Verde NPP were to experience a core-damage accident under meteorological conditions typifying Quarter 2, percent Black, percent Hispanic, percent Color and percent living in owner-occupied housing units and in population density each would be an influential variable, able to explain the likelihood of exposure to radioactivity during such an accident.

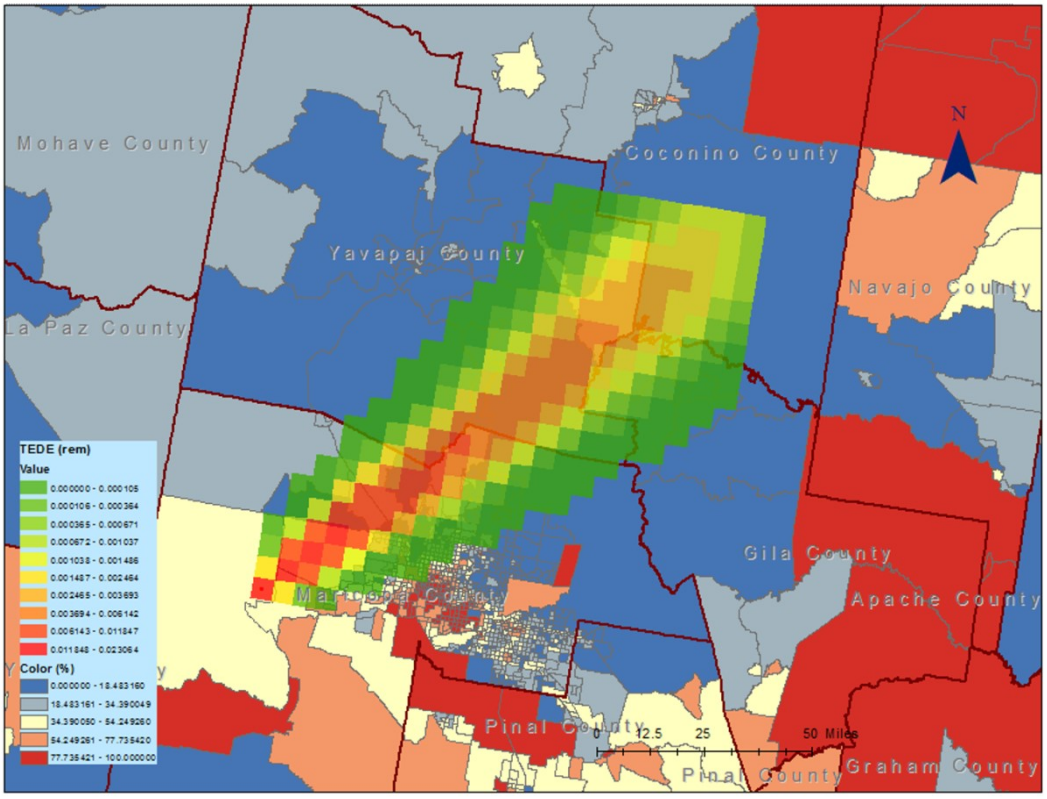


Figure 11. The projected plume path emanating from Palo Verde NPP after a simulated core-damage accident conducted under meteorological conditions typifying Quarter 2.

Figure 12. The projected plume path emanating from Palo Verde NPP after a simulated core-damage accident conducted under meteorological conditions typifying Quarter 2 overlaid on satellite imagery obtained through Google Earth.

Table 40

Demographic Composition in Areas around Palo Verde NPP located beneath the Projected Plume Path with Meteorological Conditions Typifying Quarter 2

Demographics/(TEDE rem)	(0.000-0.0003)	(0.0003-0.002)	(0.002-0.005)	(0.005-0.01)	(0.01-0.4)	Total	Outside
Tracts	421	185	131	55	12	804	722
Tract area (sq. mil.)	2,276	1,801	1,251	525	150	6,004	107,987
Total population	643,380	189,204	97,495	30,819	3,876	964,774	5,282,042
White	547,531	156,891	86,769	27,471	3,124	821,787	4,061,819
Black	21,935	6,386	3,131	786	78	32,316	208,339
Asian	21,031	4,340	2,210	762	129	28,472	150,229
Native American	6,682	2,352	683	239	11	9,967	268,369
Others	46,201	19,235	4,701	1,561	534	72,232	593,286
Hispanic	122,483	35,082	10,238	2,987	832	171,623	1,643,052
Color	180,171	50,293	17,322	5,090	1,190	254,066	2,325,719
White (%)	85.10	82.92	89.00	89.14	80.60	85.18	76.90
Black (%)	3.41	3.38	3.21	2.55	2.01	3.35	3.94
Asian (%)	3.27	2.29	2.27	2.47	3.32	2.95	2.84
Native American (%)	1.04	1.24	0.70	0.78	0.28	1.03	5.08
Others (%)	7.18	10.17	4.82	5.06	13.79	7.49	11.23
Hispanic (%)	19.04	18.54	10.50	9.69	21.48	17.79	31.11
Color (%)	28.00	26.58	17.77	16.51	30.71	26.33	44.03
Renter-occupied housing units (%)	22.65	17.10	11.54	8.98	12.47	19.75	28.70
College degree or higher (%)	27.26	27.77	29.40	32.87	18.33	27.77	26.04
Unemployed (%)	6.31	6.65	6.38	7.32	7.25	6.41	7.88
Below Poverty Line (%)	9.21	9.25	5.87	5.70	10.69	8.77	16.47
Mean household income ($)	74,049	77,654	71,533	76,691	68,980	74,527	66,108

Table 41

Pearson Correlation Coefficients between TEDE (LN) and Independent Variables of the Populations in the Projected Plume Path Emanating from Palo Verde NPP during a Core-Meltdown Accident during Quarter 2

	rho	P	count
Population Density (LN)	-0.3553	0.0000	740
Black (%)	-0.1395	0.0001	740
Asian (%)	-0.1291	0.0004	740
Hispanic (%)	-0.2147	0.0000	740
Color (%)	-0.2091	0.0000	740
Below Poverty Line (%)	0.0281	0.4450	739
Owner-Occupied Housing Units (%)	-0.1236	0.0008	739
Observations	804		

Table 42

Descriptive Statistics for Study Variables of the Population in the Projected Plume Path Emanating from Palo Verde NPP during a Core-Meltdown Accident during Quarter 2

	Mean	SD	Min	Max
TEDE (LN)	-10.016	4.569	-18.421	-3.769
Population Density (LN)	4.759	2.804	0.294	9.111
Black (%)	1.821	2.783	0.000	21.754
Asian (%)	1.945	2.845	0.000	17.912
Hispanic (%)	13.185	11.038	0.000	72.146
Color (%)	19.448	13.495	0.000	82.089
Below Poverty Line (%)	10.234	6.819	0.181	41.643
Owner-Occupied Housing Units (%)	59.797	17.557	0.000	93.627
Observations	739			

Table 43

Results of Logistic (Ordinary Least Square) Regression Analysis of TEDE (LN) and Independent Variables in Areas beneath the Projected Plume Path during Quarter 2

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.1054	0.1188+
			(1.574)	(1.694)
Asian (%)			-0.0102	-0.0322
			(-0.170)	(-0.519)
Hispanic (%)			-0.0612***	-0.0622**
			(-3.873)	(-3.243)
Color (%)	-0.0315*	-0.0246+		
	(-2.538)	(-1.848)		
Population Density (LN)	-0.5250***	-0.6184***	-0.5518***	-0.6185***
	(-8.754)	(-8.701)	(-8.612)	(-8.587)
Below Poverty Line (%)		-0.0386		-0.0043
		(-1.488)		(-0.144)
Owner-Occupied Housing Units (%)		0.0177+		0.0225*
		(1.701)		(2.138)
Constant	-6.9122***	-7.2598***	-6.7633***	-7.7099***
	(-20.385)	(-10.693)	(-20.237)	(-11.070)
Observations	740	739	740	739
R-squared	0.134	0.139	0.144	0.148
F	56.9195	29.6161	30.8437	21.1711
Log-likelihood	-2121.8573	-2115.5892	-2117.5893	-2111.7477
Akaike Info Coefficient	4249.7146	4241.1783	4245.1786	4237.4953
Moran's I-Queen	4263.5345	4264.2048	4268.2118	4269.7324

t statistics in parentheses

+ p<0.10, *p<0.05, **p<0.01, ***p<0.001

7.4 Projected Plume Path for Quarter 3

First, I projected the path of dispersion of a radioactive plume resulting from a core-damage accident at one of the three PWRs at Palo Verde NPP under meteorological conditions typifying Quarter 3. The prevailing wind direction at that time of year is west-southwest (248 degrees), with an average speed of 7.3 miles per hour, which would direct the plume to the east-northeast (Figures 13 and 14) and see it cover an area of 3,702 square miles (Table 44). Approximately 3.5 million people live in the projected plume pathway, with higher percentages of Black, Hispanic, Asian and Color among the population, many of whom live in renter-occupied housing units. The estimated TEDE for this scenario would be between 0.00 and 0.188 rem, which is below the 1 rem TEDE required to initiate either an evacuation or shelter-in-place order. The estimated TEDE is only preliminary, however, and must be validated with field data collected from the affected area at the time of the accident. The impacted areas would include Buckeye, Maricopa, Guadalupe, Chandler, Queen Creek, Florence, Coolidge, Casa Grande, Glendale, Litchfield Park, Phoenix, Tolleson, Avondale, Gilbert, Tempe, Apache Junction, and Paradise Valley (Figure 14). Higher TEDEs, shown in red (Figure 13), are observed in the cities within the affected area—namely, Buckeye, Guadalupe, Chandler, Queen Creek, Florence, Phoenix, Tolleson, Avondale, Gilbert, Tempe, Apache Junction, and Paradise Valley.

Second, before conducting the OLS regression analysis, I examined the correlations that exist, if any, between the dependent and independent variables. Correlation coefficients indicated significant correlation, with percent Hispanic and percent Color being among the most-strongly correlated (Table 46). Descriptive statistics

are provided in Table 45. Percent Color, percent Black, percent Asian, percent Hispanic and population density, in particular, showed statistically significant associations with the dependent variable (Table 47). Other socio-economic variables, including percent living below the federal poverty line and percent living in owner-occupied housing units, were significant in explaining the likelihood of exposure to radioactive effluents.

In sum, this projection revealed that, were a core-damage accident to take place at Palo Verde NPP under meteorological conditions typifying Quarter 3, as many as approximately 3.5 million people could be exposed to the resulting radioactive plume. The likelihood of exposure to radioactive effluents during the 24-hour period immediately following such an accident was strongly associated with census tracts that included among their population a higher percent Color, percent Black, percent Hispanic, percent Asian, percent living below the federal poverty line, percent living in owner-occupied housing units and population density than compared to the surrounding census tracts that would not be in the projected path of the radioactive plume.

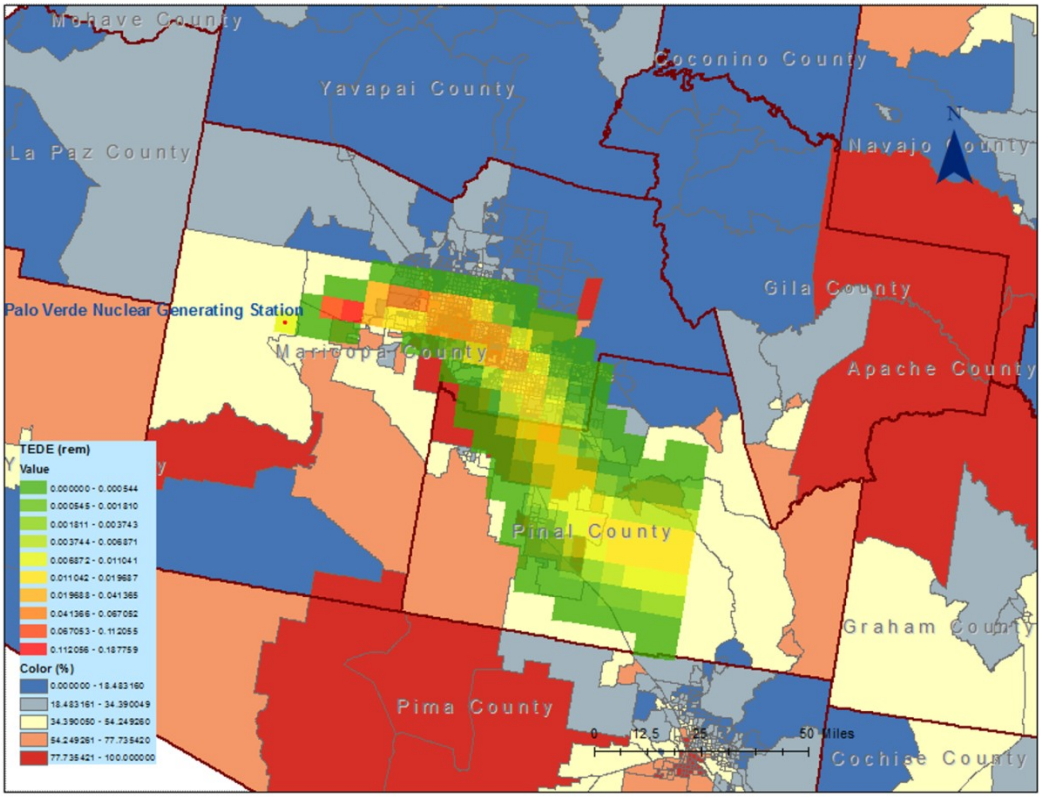


Figure 13. The projected plume path emanating from Palo Verde NPP after a simulated core-damage accident conducted under meteorological conditions typifying Quarter 3.

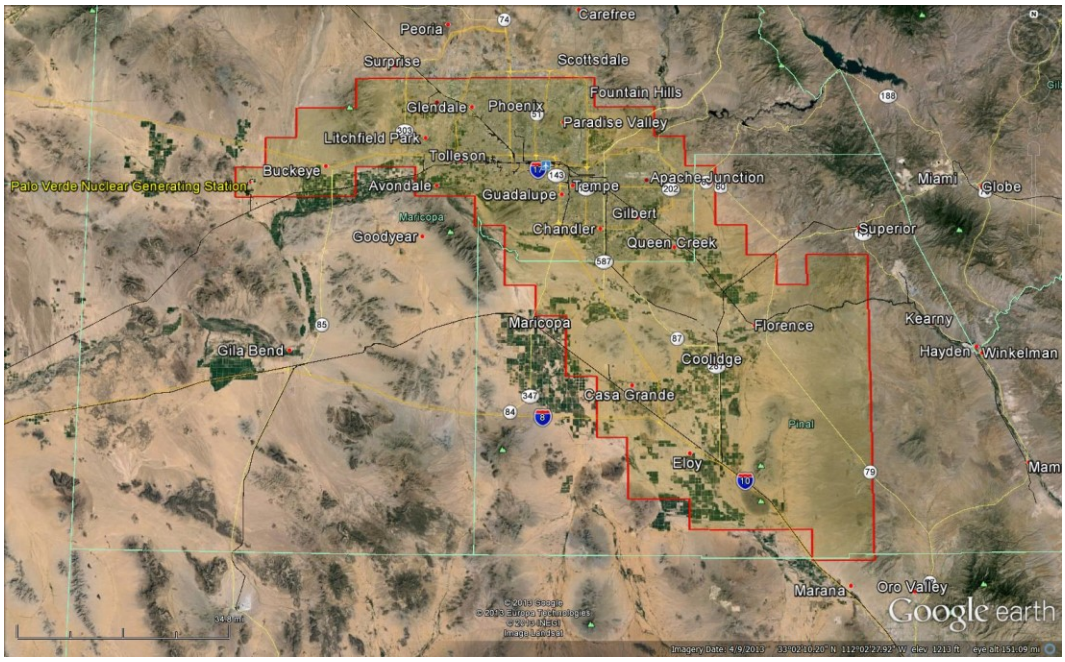


Figure 14. The projected radioactive effluents plume path originating from Palo Verde NPP in the event of a core-damage accident simulated under meteorological conditions typifying Quarter 3 overlaid on satellite imagery obtained through Google Earth.

Table 44

Demographic Composition in Areas around Palo Verde NPP located beneath the Projected Plume Path with Meteorological Conditions Typifying Quarter 3

Demographics/(TEDE rem)	(0.000-0.0003)	(0.0003-0.002)	(0.002-0.005)	(0.005-0.01)	(0.01-0.4)	Total	Outside
Tracts	484	168	97	172	589	1,510	16
Tract area (sq. mil.)	1,426	550	325	575	826	3,702	110,288
Total population	1,024,487	335,466	162,860	344,957	1,601,288	3,469,058	2,777,758
White	856,746	261,947	131,867	278,370	1,195,778	2,724,708	2,158,899
Black	33,563	17,001	7,129	13,314	107,419	178,427	62,228
Asian	29,532	9,657	6,904	11,525	62,536	120,154	58,547
Native American	16,039	9,150	2,425	13,270	35,586	76,470	201,866
Others	88,608	37,711	14,534	28,478	199,968	369,299	296,219
Hispanic	207,529	93,733	25,983	92,706	685,726	1,105,677	708,997
Color	300,148	133,971	44,709	134,774	907,417	1,521,017	1,058,768
White (%)	83.63	78.08	80.97	80.70	74.68	78.54	77.72
Black (%)	3.28	5.07	4.38	3.86	6.71	5.14	2.24
Asian (%)	2.88	2.88	4.24	3.34	3.91	3.46	2.11
Native American (%)	1.57	2.73	1.49	3.85	2.22	2.20	7.27
Others (%)	8.65	11.24	8.92	8.26	12.49	10.65	10.66
Hispanic (%)	20.26	27.94	15.95	26.87	42.82	31.87	25.52
Color (%)	29.30	39.94	27.45	39.07	56.67	43.85	38.12
Renter-occupied housing units (%)	23.29	24.85	19.24	34.99	37.84	30.84	23.41
College degree or higher (%)	27.30	23.11	37.66	31.16	24.13	26.39	26.23
Unemployed (%)	6.58	6.80	5.90	7.11	8.20	7.37	8.03
Below Poverty Line (%)	10.22	11.92	6.28	13.17	20.34	15.16	15.41
Mean household income ($)	73,210	68,029	102,708	68,579	62,674	68,917	65,685

Table 45

Descriptive Statistics for Study Variables of the Population in the Projected Plume Path Emanating from Palo Verde NPP during a Core-Meltdown Accident during Quarter 3

	rho	P	count
Population Density (LN)	0.2281	0.0000	1417
Black (%)	0.1816	0.0000	1417
Asian (%)	0.1065	0.0001	1417
Hispanic (%)	0.2445	0.0000	1417
Color (%)	0.2461	0.0000	1417
Below Poverty Line (%)	0.1865	0.0000	1415
Owner-Occupied Housing Units (%)	-0.2246	0.0000	1415
Observations	1510		

Table 46

Pearson Correlation Coefficients between TEDE (LN) and Independent Variables of the Populations in the Projected Plume Path Emanating from Palo Verde NPP during a Core-Meltdown Accident during Quarter 3

	Mean	SD	Min	Max
TEDE (LN)	-7.018	4.114	-18.421	-1.673
Population Density (LN)	7.349	2.000	0.879	10.012
Black (%)	5.079	5.694	0.000	55.172
Asian (%)	3.630	4.767	0.000	42.478
Hispanic (%)	30.392	23.367	0.000	95.415
Color (%)	44.995	25.642	0.212	100.000
Below Poverty Line (%)	15.569	13.710	0.000	80.769
Owner-Occupied Housing Units (%)	58.545	19.817	0.000	100.000
Observations	1415			

Table 47

Results of Logistic (Ordinary Least Square) Regression Analysis between TEDE (LN) and Independent Variables in Areas beneath the Projected Plume Path during Quarter 3

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0891***	0.0804***
			(4.899)	(4.417)
Asian (%)			0.1561***	0.1613***
			(7.050)	(7.202)
Hispanic (%)			0.0402***	0.0291***
			(8.625)	(5.434)
Color (%)	0.0417***	0.0425***		
	(10.382)	(7.372)		
Population Density (LN)	0.4990***	0.4528***	0.3978***	0.3990***
	(9.702)	(8.584)	(7.660)	(7.423)
Below Poverty Line (%)		-0.0243+		0.0250*
		(-1.952)		(2.288)
Owner-Occupied Housing Units (%)		-0.0256***		-0.0147*
		(-3.779)		(-2.167)
Constant	-12.5556***	-10.3829***	-12.1789***	-11.3549***
	(-28.533)	(-14.336)	(-29.277)	(-15.207)
Observations	1417	1415	1417	1415
R-squared	0.119	0.128	0.142	0.156
F	95.6615	51.6805	58.2396	43.4536
Log-likelihood	-3924.0212	-3911.8999	-3905.7380	-3888.4983
Akaike Info Coefficient	7854.0425	7833.7997	7821.4760	7790.9965
Moran's I-Queen	7869.8114	7860.0742	7847.7575	7827.7807

t statistics in parentheses

+ p<0.10, *p<0.05, **p<0.01, ***p<0.001

7.5 Projected Plume Path for Quarter 4

First, I projected the dispersion path of a plume resulting from a core-damage accident at Palo Verde NPP under meteorological conditions typifying Quarter 4. The prevailing wind direction in this simulation was to the west (270 degrees), with winds carrying the radioactive effluents to the east (Figures 25 and 26), dispersing them across an area as large as 3,327 square miles (Table 54). As many as an estimated 2.3 million people would be exposed to the radiation carried by the plume. The effected population would include a higher percent Color, percent Black, percent Hispanic and percent Asian than compared to the population living outside of the projected plume path. Under the conditions used in this simulation, those living beneath the projected path of the plume would be exposed to an estimated TEDE that ranges between 0.00 and 0.371 rem, which is again lower than the 1 rem called for in order to initiate either an evacuation or shelter-in-place order. As for the prior simulations, these observations would need to be validated with field data collected at the time of the accident. The affected areas would include Buckeye, Goodyear, Guadalupe, Chandler, Queen Creek, Florence, Coolidge, Litchfield Park, Tolleson, Avondale, Gilbert, Tempe, Apache Junction, and Paradise Valley (Figures 15 and 16). Higher TEDEs, shown in red (Figure 15), tended to be observed in the cities—namely, Buckeye, Guadalupe, Chandler, Queen Creek, Litchfield Park, Tolleson, Avondale, Gilbert, Tempe, Apache Junction, and Paradise Valley (Figures 15 and 16).

Second, I found there to be a greater correlation between the dependent variable of TEDE and percent Black, percent Hispanic and population density (Table 49). There were 1,050 census tracts included in the dataset; summary statistics of the study variables

are depicted in Table 50. In models 1 and 3, percent Color, percent Black, percent Asian, percent Hispanic and population density each showed a significant relationship with the dependent variable (Table 51). In models 2 and 4, each of the racial/ethnic variables, as well as population density and percent living in owner-occupied housing units, had a statistically significant relationship with the dependent variable.

In short, in the event of a core-damage accident at one of the three PWRs at Palo Verde NPP under meteorological conditions typifying Quarter 4, those census tracts in which the percent Color, percent Black, percent Hispanic, percent living below the federal poverty line and percent living owner-occupied housing units were higher than in the surrounding areas would have an increased likelihood of being exposed to radioactive effluents.

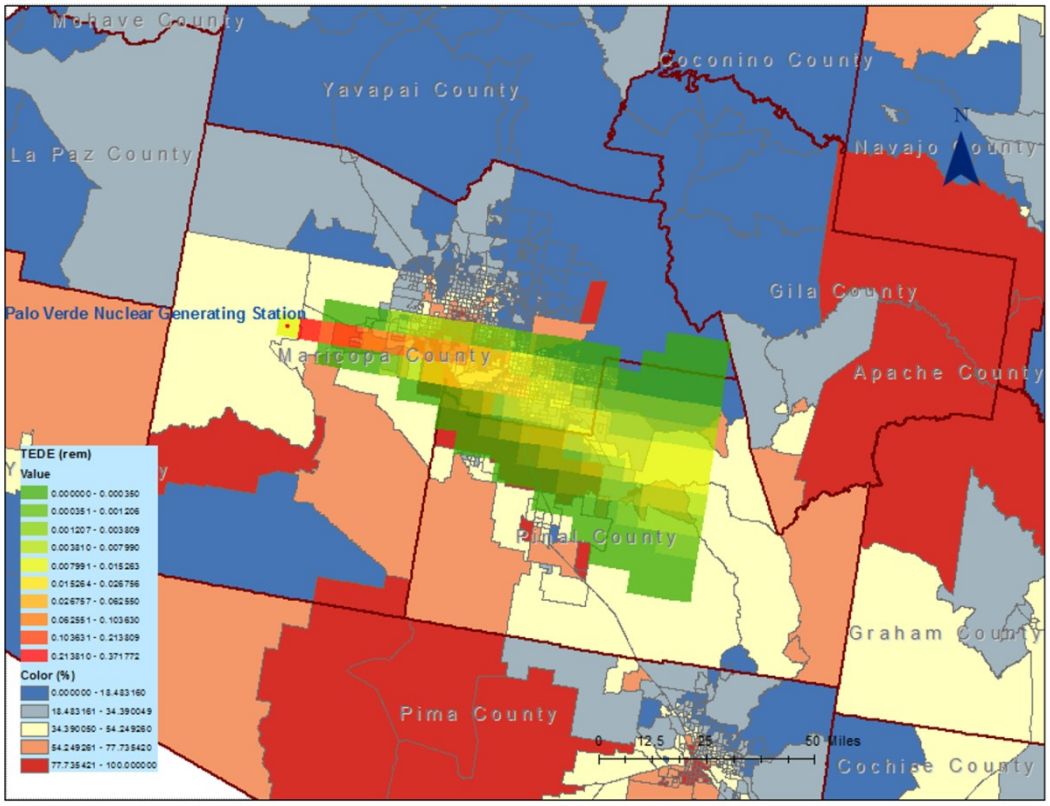


Figure 15. The projected plume path emanating from Palo Verde NPP after a simulated core-damage accident conducted under meteorological conditions typifying Quarter 4.

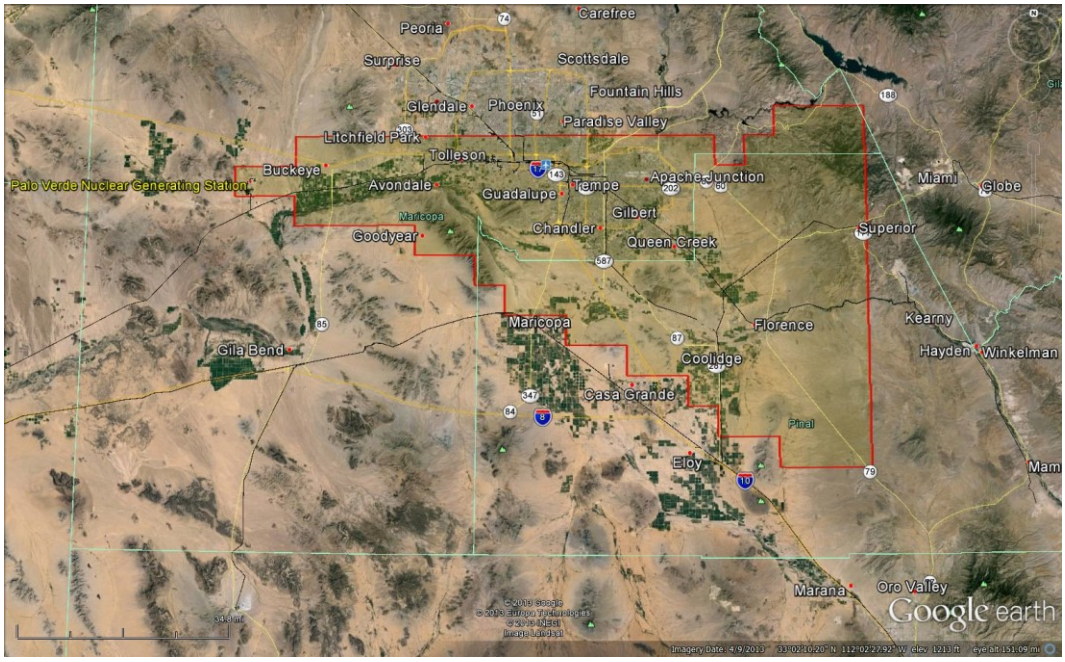


Figure 16. The projected radioactive effluent plume path originating from Palo Verde NPP in the event of a core-damage accident under meteorological conditions typifying Quarter 4 overlaid on satellite imagery obtained through Google Earth.

Table 48

Demographic Composition in Areas around Palo Verde NPP located beneath the Projected Plume Path with Meteorological Conditions Typifying Quarter 4

Demographics/(TEDE rem)	(0.000-0.0003)	(0.0003-0.002)	(0.002-0.005)	(0.005-0.01)	(0.01-0.4)	Total	Outside
Tracts	142	159	199	229	356	1,085	441
Tract area (sq. mil.)	1,126	525	400	550	725	3,327	110,663
Total population	158,798	336,474	461,824	580,558	798,994	2,336,649	3,910,167
White	131,442	281,968	368,090	442,544	603,861	1,827,905	3,055,701
Black	4,680	11,963	19,428	32,461	58,381	126,912	113,743
Asian	4,034	6,342	10,642	20,528	41,548	83,094	95,607
Native American	7,414	9,795	13,343	11,251	15,471	57,273	221,063
Others	11,228	26,406	50,322	73,774	79,734	241,465	424,053
Hispanic	27,843	90,260	163,568	260,908	251,684	794,263	1,020,411
Color	46,200	122,338	211,141	331,486	378,173	1,089,338	1,490,448
White (%)	82.77	83.80	79.70	76.23	75.58	78.23	78.15
Black (%)	2.95	3.56	4.21	5.59	7.31	5.43	2.91
Asian (%)	2.54	1.88	2.30	3.54	5.20	3.56	2.45
Native American (%)	4.67	2.91	2.89	1.94	1.94	2.45	5.65
Others (%)	7.07	7.85	10.90	12.71	9.98	10.33	10.84
Hispanic (%)	17.53	26.83	35.42	44.94	31.50	33.99	26.10
Color (%)	29.09	36.36	45.72	57.10	47.33	46.62	38.12
Renter-occupied housing units (%)	17.55	29.99	35.66	36.67	27.17	30.85	25.45
College degree or higher (%)	27.40	24.34	21.51	22.42	31.96	26.12	26.43
Unemployed (%)	5.63	6.66	7.86	8.59	6.64	7.29	7.88
Below Poverty Line (%)	9.12	17.57	18.80	18.99	11.58	15.51	15.13
Mean household income ($)	80,123	58,299	57,641	63,297	80,402	68,100	67,071

Table 49

Pearson Correlation Coefficients between TEDE (LN) and Independent Variables of the Populations in the Projected Plume Path Emanating from Palo Verde NPP during a Core-Meltdown Accident during Quarter 4

	rho	P	count
Population Density (LN)	0.3423	0.0000	1052
Black (%)	0.2025	0.0000	1052
Asian (%)	0.0801	0.0094	1052
Hispanic (%)	0.2116	0.0000	1052
Color (%)	0.1198	0.0001	1052
Below Poverty Line (%)	-0.0144	0.6401	1050
Owner-Occupied Housing Units (%)	-0.0196	0.5261	1050
Observations	1085		

Table 50

Descriptive Statistics for Study Variables of the Population in the Projected Plume Path Emanating from Palo Verde NPP during a Core-Meltdown Accident during Quarter 4

	Mean	SD	Min	Max
TEDE (LN)	-5.967	3.081	-18.421	-0.989
Population Density (LN)	7.047	2.165	0.597	10.010
Black (%)	5.110	6.680	0.000	55.172
Asian (%)	3.362	4.621	0.000	30.054
Hispanic (%)	29.857	24.192	0.000	95.415
Color (%)	45.751	27.049	0.212	100.000
Below Poverty Line (%)	15.923	15.057	0.000	80.769
Owner-Occupied Housing Units (%)	59.229	19.965	0.000	100.000
Observations	1050			

Table 51

Results of Logistic (Ordinary Least Square) Regression Analysis of TEDE (LN) and Independent Variables in Areas beneath the Projected Plume Path of a Core-Meltdown Event at Palo Verde NPP during Quarter 4

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0763***	0.0779***
			(5.796)	(5.928)
Asian (%)			0.0570**	0.0568**
			(2.903)	(2.868)
Hispanic (%)			0.0166***	0.0200***
			(4.236)	(4.601)
Color (%)	0.0147***	0.0295***		
	(4.480)	(6.313)		
Population Density (LN)	0.4919***	0.5035***	0.4182***	0.4323***
	(12.024)	(11.929)	(9.949)	(9.791)
Below Poverty Line (%)		-0.0298**		-0.0004
		(-2.981)		(-0.048)
Owner-Occupied Housing Units (%)		0.0094		0.0143*
		(1.598)		(2.440)
Constant	-10.1052***	-10.9491***	-9.9915***	-11.0366***
	(-29.717)	(-18.089)	(-32.655)	(-18.126)
Observations	1052	1050	1052	1050
R-squared	0.134	0.153	0.169	0.176
F	80.9861	47.2312	53.0458	37.2515
Log-likelihood	-2599.4595	-2583.6489	-2577.9208	-2568.9594
Akaike Info Coefficient	5204.9190	5177.2979	5165.8417	5151.9188
Moran's I-Queen	5219.7943	5202.0806	5190.6339	5186.6146

t statistics in parentheses

+ p<0.10, *p<0.05, **p<0.01, ***p<0.001

7.6 Projection Limitations

I utilized the RASCAL 4.3 code to run simulations that applied the most commonly prevailing meteorological conditions for Quarters 1, 2, 3 and 4. The RASCAL program has been developed by the NRC over the past 25 years for use as a tool in conducting rapid assessments in the wake of a nuclear power-related accident, and for use in aiding first responders by providing them with the information they need in order to make informed decisions as to whether to evacuate or shelter in place (U.S.NRC, 2013). The program also has been used to stimulate and evaluate the release of radioactive effluents into the atmosphere that results from accidents at NPPs, spent-fuel storage pools and casks, and fuel-recycling facilities. In addition, the version used here—RASCAL 4.3—is the same code as was used by NRC staff to assess the plume path and potential impacts of events during the accident at Fukushima and to provide technical expertise to Japanese authorities involved in the decision-making process (RASCAL Class Training July 11 and 12, 2013).

There are several limitations associated with plume path projections. First, the shape, size and direction of dispersal of the plume is largely dependent on prevailing weather conditions (Ramsdell, Athey, & Rishel, 2013). Therefore, the four projections presented and discussed in this chapter may not resemble the actual plume footprint that would occur in the event of an actual accident on any given day during any calendar quarter. Second, the use of this stimulation data in briefings delivered to decision makers during an actual emergency is not recommended without first incorporating current meteorological data for a period beginning a few hours prior to the event (Ramsdell et al., 2013); any discussions that might occur surrounding the decision to evacuate that are

based on the projected plume footprints presented here are not practical and are not recommended. Third, the STDose model used here is designed to estimate projected radiation doses delivered via a radioactive effluent plume to downwind populations. Based on the dose levels the model estimates, evacuation and shelter-in-place decisions could then be made based on the EPA's *Manual of protective action guides and protective actions for nuclear incidents* (US EPA, 1992b). However, these guidelines suggest a range of 1–5 rem before the issuing of either an evacuation or shelter-in-place order, whereas the NRC recommends evacuation in most incidents with a projected dose of 1 rem and offers no specific minimum level for a shelter-in-place order (Ramsdell et al., 2013). In addition, the actual TEDE is meant to be re-estimated with field data collected on site by the EPA's Radiological Emergency Response Team (RERT), using the Field Measurement to Dose model (RASCAL Class Training July 11 and 12, 2013). Extreme caution therefore must be taken in interpreting the rough estimate of radiation dose provided by the STDose model and in applying those estimates to inform on the decision to issue evacuation orders, or to inform on evacuation strategies, more broadly.

Above all, I greatly benefited from the availability of the RASCAL STDose model, as it provided me a means to simulate a plume pathway with a rough estimate of radiation dose in order to understand how socio-demographic characteristics are or might be associated with radiation exposure, so long as the weather conditions input to the model represent a day typical of one of four calendar quarters.

7.7 Implications for Environmental Justice

In this chapter, I have provided my findings pertaining to the statistical associations that exist between radiation dose and the socio-demographic characteristics of the affected populations during a simulated core-damage accident at Palo Verde NPP. Based on these findings, it is now possible for me to discuss the implications such an accident would have for environmental justice issues; I will do so across two dimensions: the environmental justice need for a fair and equitable distribution of environmental risks, and the notion of equal protection from potential environmental and health hazards.

7.7.1 Distribution of environmental and health risk

First, to achieve environment justice, access and exposure to environmental goods and ills need to be equally distributed across all members of society. The simulations detailed above show that there exists a huge population that potentially could be exposed to radiation in the event that a core-meltdown accident occurred at the Palo Verde NPP. The affected population could range in size from 0.67 million to 3.5 million, out of a total of 6 million people living in the state of Arizona, varying based on the time of year and the prevailing weather conditions. This implies that the potential risk of a core-meltdown accident at Palo Verde, in a worst-case scenario, is a burden shared by more than half of all Arizonans. My examination of the socio-demographic characteristics of the affected population, however, shows that minority groups—namely percent Black, percent Asian, percent Hispanic, and percent Other—are over-represented as compared to their percent composition in those communities located outside of the affected area. This also implies that particular minority groups shoulder a disproportionately greater share of the potential environmental and health hazards, and therefore are faced with environmental justice

issues. In those groups that would be exposed to the highest TEDE, anywhere from 0.01 rem to 0.4 rem, there is observed a higher percent Black, percent Asian, percent Hispanic, and percent Other. This could be taken as implying that these ethnic/racial groups are vulnerable to potential exposure to radioactive plume, which would result in their exposure to a higher TEDE; in such a case, they would therefore be said to face environmental injustice because they do not have equal access to protection from the potential environmental and health hazards posed by the release of radiation.

Bolin and colleagues (2013) recently claimed that populations in peripheral suburbs in Arizona face an emergent double exposure to risk, in the form of an imminent water resource shortfall and the foreclosures and plunging home values that began with the housing crisis that gripped much of the U.S. in 2007–2008, the effects of which are still being felt by homeowners to this day. In fact, this study adds an additional form of exposure to this—the risk of radiation exposure as a result of a core-meltdown accident occurring at Palo Verde Nuclear Generating Station (PVNGS), which would have an unthinkable and irreversible impact on the lives of Arizonans. Arizonans therefore can be said to face a triple exposure to risk that puts them in a position in which they can surely be said to face environmental injustice issues.

7.7.2 Equal access to protection from environmental and health risks

I examined the extent to which certain communities could claim equal access to protection from the potential risk of radiation associated with a core-meltdown accident at Palo Verde NPP. To minimize the effects from the nuclear radiation that would be released during such an accident, it is critical that the populations living in the affected areas be evacuated in a timely manner. This could only be achieved if there was in place

a comprehensive emergency plan, and if there was effective coordination and cooperation among all stakeholders. I identified several challenges standing in the way of achieving the ultimate goal of orderly evacuation, most of which arise because the goal requires that stakeholders share responsibilities. Referring to President Jimmy Carter's decision of December 7, 1979, the Federal Emergency Management Agency (FEMA) is fully responsible for taking the lead role in overseeing offsite emergency planning and response while the NRC is tasked with assisting FEMA in carrying out its activities (US NRC, 2011a). When the incident is associated with higher levels of risk—for example, a general emergency such as core damage accident—the Department of Homeland Security (DHS) assumes responsibility for coordinating the efforts of various federal, state, tribal, and local organizations. While federal, state, local, and tribal officials share responsibilities, the latter three are primarily responsible for prevention action decisions and the issuing of instructions to affected populations (US FEMA, 2013a). In a recent report (US FEMA, 2013), FEMA stated clearly that during an emergency, a joint information center (JIC) should be established near the accident site so that national spokespersons can better coordinate with state, local, and tribal government officials in such a way that they reinforce their decision making and build trust and confidence among the public. The evacuation process in any such scenario clearly would not be simple, as it would involve multiple stakeholders who would have to play various roles while sharing responsibilities. The major stakeholders and their shared responsibilities are depicted below (Figure 27), and include the following:

(1) PVNGS: According to the NRC (US NRC, 2011a), there are four types of emergencies related to nuclear power plant incidents: notification of unusual event

(NOUE), alert, site area emergency (SAE), and general emergency (GEm). A SAE is an event that requires the protecting of the public, whereas a GEm is an event such as a core-damage accident that requires protection of public. The release of radioactive materials from a SAE may not exceed the EPA PAGs, whereas the release resulting from a GEm may. In either event, PVNGS is required to provide a protective action recommendation (PAR) to state, local, and tribal agencies within 15 minutes of the incident. To generate the PAR as soon after the event as possible, PVNGS's field data team is tasked with collecting air samples at 10-minute intervals along a central axis of the radioactive plume as it disperses. Using RASCAL software, PVNGS then can project the radiation doses and validate the estimated doses and plume dispersion with field data, after which they can provide a PAR to state, local, and tribal agencies. A total of 48 outdoor warning sirens located within the 10-mile radius of PVNGS's emergency planning zone are to be turned on as soon as the event is initiated (Maricopa County Emergency Management, 2013) and a JIC is formed near the incident site. In addition, PVNGS is required inform its PARs to NPP within 60 minutes (Figure 17).

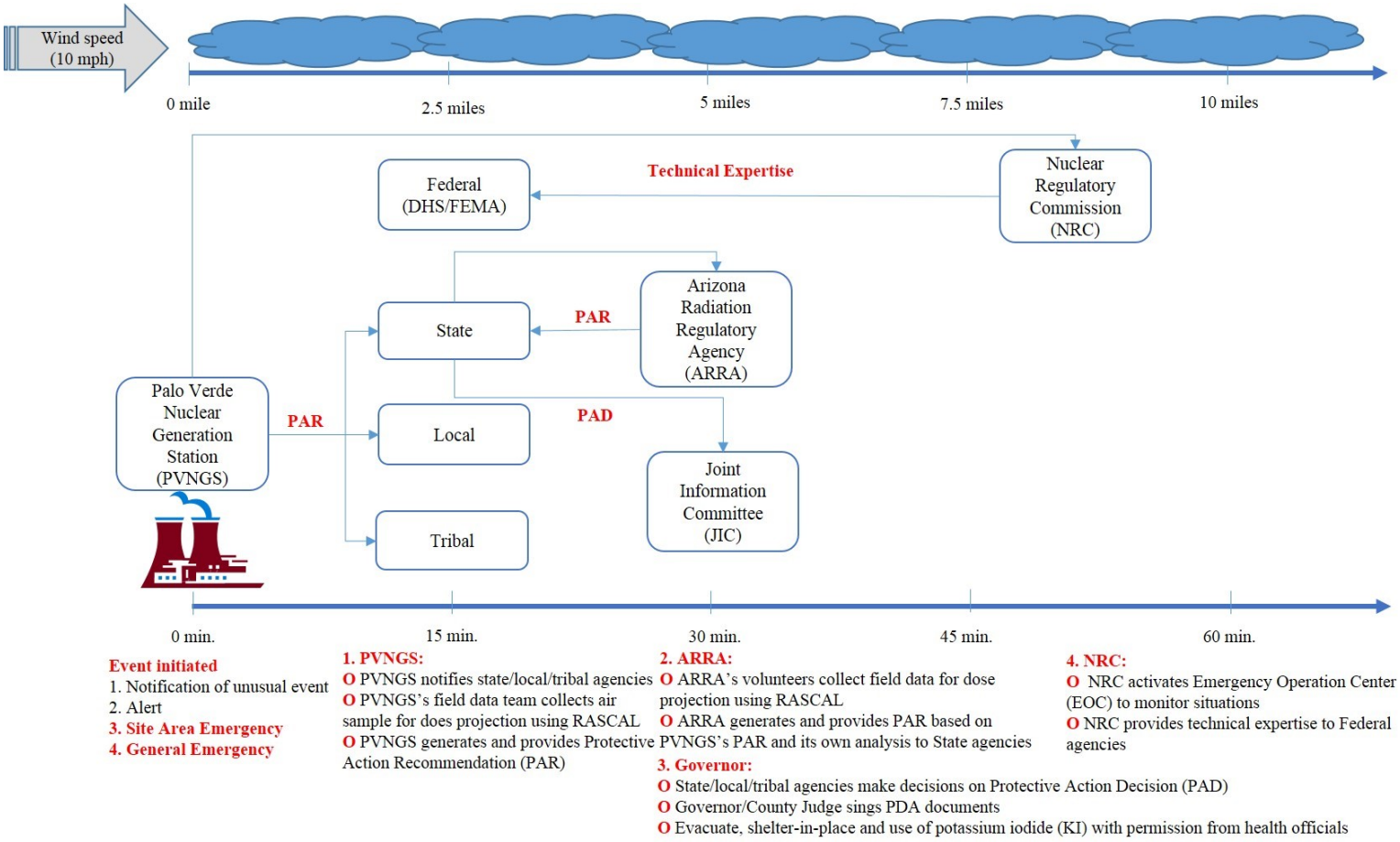


Figure 17. A tentative timeline for preparing a protective action decision (PAD) in the case of a GEm at PVNGS

(2) Arizona Radiation Regulatory Agency (ARRA): ARRA's Monitor Pool, a group of volunteers drawn from various state and Maricopa County agencies who take a week-long training course and day-long annual refresher courses to maintain their proficiency, starts collecting field data including radiation surveys and both environmental and foodstuff samples at the PVNGS site (ARRA, 2013). Then ARRA generates a PAR that is based on both their own analysis and PVNGS's PAR; ARRA provides its PAR to state, local, and tribal agencies (Figure 27).

(3) State, local, and tribal agencies: the state, local, and tribal agencies review the PAR provided by ARRA in order to prepare a protection action decision (PAD). The PAD is signed by either the Governor of the state of Arizona or by a Maricopa County Judge and is then sent out to all concerned agencies. A PAD will normally include instructions for evacuation, sheltering-in-place, and the administering of potassium-iodide (KI). Meanwhile, the NRC is tasked with monitoring and evaluating the situations as it develops in order to provide technical leadership to the federal government officials (Figure 27).

7.7.3 Potential effectiveness of emergency evacuation plan

Having discussed the process behind the decision to issue a call for evacuation, I would now like to evaluate the potential effectiveness of evacuation from an emergency management perspective. The effectiveness of any emergency preparedness plan is dependent on how planning, training, and existing, written plans relate to one another and to the ultimate goal of a successful emergency evacuation in the face of a natural or technological disaster (Perry & Lindell, 2003). In the following paragraphs, I will

evaluate the potential effectiveness of emergency planning by examining the relationship between planning, training, and written plans.

First, in terms of planning, evacuation plans do not focus on mitigation before an incident takes place, but rather emphasize the response to a disaster. In general, an emergency management plan includes four phases: mitigation, or activities designed to minimize the impacts of the event; preparedness, or activities designed to prepare stakeholders to identify and assess to potential impacts; response, or activities having to do with how stakeholders respond to an emergency; and, recovery, or activities designed to restore and rebuild the affected areas to pre-emergency conditions (Choi, 2008). The first two phases involve efforts that must be undertaken before an emergency has occurred, while the latter two are focused on efforts undertaken after the emergency has already taken place. As part of any effective emergency management plan, to minimize the potential impacts of the disaster every effort must be made for both mitigation and preparedness. Lead time is very important for both mitigation and preparedness. For example, a tsunami early-warning system could issue a warning anywhere from a few minutes to hours before the actual tsunami would hit the affected areas, providing the local population ample lead time to mitigate the risks they face by relocated to a designated safe haven.

Looking at the tentative timeline for response and rescue efforts in the aftermath of a nuclear power-related incident (Figure 27), I would argue that the evacuation process is not designed in a way to mitigate the risks to people living in areas prone to exposure because of the lack of lead time. With no or insufficient lead time, the planned evacuation process could be delayed for any of three reasons:

(1) Within 15 minutes of an emergency event occurring, PVNGS would be expected to provide a PAR to the relevant state, local, and tribal agencies. This seems unrealistic in this context because projecting radiation doses and the plume path requires the collecting and analysis of field data. Collection of field data at 10-minute intervals along the central axis requires a certain amount of time. In addition, it is unclear how soon after the event plant management would recognize that they faced an emergency or potential disaster scenario—for instance, PVNGS has in the past experienced a leak of radiation-contaminated water from one of the three reactors on site that went unnoticed for an unknown period of time (Randazzo, 2013). On October 5, 2013, the plant found a small leak in reactor unit 3 during regular re-fueling. It was estimated that the leak had been responsible for the release of radioactive fluid at a rate of 0.01 gallons per minute; the leak was contained within the reactor unit housing and did not reach the outside environment. The humidity detector inside the reactor's containment dome did not detect the leak, which likely transformed into steam as soon as the fluid leaked from the reactor vessel. The leak therefore went undetected until the reactor was opened for a scheduled refueling, which normally occurs every 18–24 months, as part of the normal refueling cycle. In addition to the unnoticed leak, PVNGS has also been shut down due to a problem with a valve on one of the reactor's two steam generators, on November 11, 2013 (The Associated Press, 2013); the NRC described it as a near-miss event because of the risk of damage to the reactor core (Lochbaum, 2012). Given these problems with event detection, it is highly unlikely PVNGS authorities would be able to complete a PAR within 15 minutes of core-meltdown accident.

(2) It is up to ARRA to provide a PAR, based on PVNGS's PAR and its own analysis, within 15 minutes after having received notification and information from the NPP. Before the agency can provide dose estimates, their volunteer Monitor Pool must first collect field data. Even if said volunteers are in Phoenix at the time of the accident, they would still have to travel a distance of some 60 miles, from ARRA's offices to PVNGS, located in Tonopah. The travel time alone may be as much as one hour, and that again assumes near-instant identification and notification of the event. Once field data were collected, ARRA must then input the observations to produce dose estimates using RASCAL. It is therefore highly unlikely that ARRA would be able to generate a PAR within 15 minutes.

(3) The 15-minute timeframe from when ARRA receives a PAR from PVNGS to produce a PAR also includes time allocated for state, local, and tribal stakeholder agencies to make decisions on a PAD. After making a PAD, it must be signed by the Governor of the state of Arizona or a Maricopa County Judge before it can take effect. The timeline for an emergency evacuation therefore could not be said to begin immediately upon the occurrence of the emergency event.

The potential delays that are part of the planned timeframe amount, in a best-case scenario, to a 30-minute window elapsing before the agency in charge reaches a PAD and can take actions to put it into effect; unfortunately, the dispersal of the radioactive plume emanating from the NPP would not pause during this time. It will instead continue to disperse based on the wind speed and direction conditions that prevail at that time. Supposing that the wind speed was 10 miles per hour, the plume will have traveled over 10 miles within 60 minutes. Any delay in providing a PAD means it is highly likely that

the populations living in the plume pathway exposure zone will be unnecessarily exposed to radiation, leading to increased risk of injury and death.

The second dimension is training and, in particular, the relationship between training and the implementing of an evacuation process. Under FEMA's Radiological Emergency Response Plans (RERP), the most recent drill to assess the emergency response preparedness for medical emergencies related to radiation exposure was conducted on November 1, 2011 (US FEMA, 2011). Seven stakeholders participated in the drill, including ARRA, PVNGS, and Buckeye Valley Fire Department (BVFD). In practice, there are more than seven stakeholders, including other fire departments and first responders. The purpose of the exercise was to respond to an emergency involving two patients suffering from radiation-related injuries and to transport them to hospital. The report indicated that BVFD had no permanent dosimeters but borrowed ones, and emergency responders had direct reading dosimeters that are needed to collect data on radiation levels according to the EPA's PAGs (US FEMA, 2011). Watkins and colleagues (2011) found that 26 of the 31 states that host a NPP were poorly prepared to undertake an adequate response to a major radiation emergency. In particular, they found that those tasked with exposure assessment, environmental sampling, human specimen collection and analysis, and human health assessment were poorly prepared to meet their responsibilities as laid out in the written response plans. In fact, PVNGS and ARRA's work to assess radiation doses and produce PARs are critical parts in getting to a PAD in any emergency planning process (Figure 27). Past training efforts have overlooked several important elements, however, including drills or exercises on risk assessment, field data collection, radiation dose estimation and on compiling a PAR. In addition, past

training has also overlooked the risk-communication element, as described by Perry & Lindell (2003), who saw that training meant to facilitate communication between at-risk populations and other federal, state, and local agencies with no active role to play in emergency planning could be important to overall success in such a scenario. Risk-communication training should include at-risk populations residing near NPPs; such populations also should be provided with KI tablets and instructions on when and how to properly use (Perry & Lindell, 2003).

The third dimension of emergency planning is the relationship between emergency response planning documents and the planning process (Perry & Lindell, 2003). I found that emergency planning and preparedness were well documented, including the EPA's *Manual of protective action guides and protective action for nuclear incidents* (US EPA, 1992) and FEMA's action guide (US EPA, 1992a; US FEMA, 2013a). These documents, however, do not relate explicitly to the planning process. For example, there are duplicate calls for similar work to be carried out by PVNGS and ARRA in regard to the collection of field data and the estimating of radiation doses using RASCAL. In addition, the NRC, in its duties of monitoring such situation, is also tasked with carrying out dose estimations based on the collected field data, again using RASCAL. If these duplicated works could be reduced, the time required for a comprehensive risk assessment would be shortened.

In the above sections, I discussed how my findings relate to the issue of environmental justice across two dimensions—namely, the distribution of environmental and health hazards and the notion of equal access to protection from potential environmental and health hazards. From a risk distribution perspective, I found that at-

risk populations tended to include disproportionately high shares of minorities, including populations of Black, Asian, Hispanic, and Other. From an equal access to protection perspective, I found that the current emergency planning protocol has not shown sufficient evidence that it is able to protect host communities and their populations from being unnecessarily exposed to high doses of nuclear radiation.

7.8 Summary

In this chapter, I presented four simulations of the dispersal into the atmosphere of a radioactive plume conducted using the RASCAL STDose model. I found that, depending on the time of the year and the prevailing weather conditions under which the event occurred, anywhere from approximately 660,000 to 3.5 million Arizonans would be exposed to the radioactive plume. The area covered by the plume could range in size from 3,327 square miles to as large as 6,004 square miles. In general, I found that percent Color, percent Black, percent Hispanic, percent Asian, population density, percent living below the federal poverty line and percent living in owner-occupied housing unit each were influential in explaining the likelihood of exposure to radiation during a core-damage accident. From both an environmental risk distribution and an equal access to protection perspective, I found that the at-risk populations faced environmental justice issues that stemmed from their unequal potential exposure to nuclear radiation from such an event.

Chapter 8

CONCLUSIONS

This study has addressed the environmental justice issues facing the host communities of the 65 U.S.-based commercial NPPs. The four goals of this study were: (1) to identify whether the socio-demographic characteristics of the populations of host communities, defined as those within a 50-mile radius of a NPP, exhibited any disparities of note in comparison to populations living in communities located outside of that same 50-mile radius from a NPP, and whether those disparities exhibited any overarching trend during the periods 1990–2000 and 2000–2010; (2) to investigate whether there exists any statistical association between the host communities' distance from a NPP and their socio-demographic characteristics and composition; (3) to evaluate the levels of potential risk associated with NPPs and determine whether there exists any correlation between risk and the socio-demographic characteristics of specific populations living in the host communities; and, (4) to identify whether there exists any association between the likelihood of exposure to radioactive effluents in a simulated core-damage accident at a single NPP and the socio-demographic characteristics of the host communities' populations.

8.1 Disparities in Exposure to NPP-related Risks

The research methods applied in this study yielded fruitful results, allowing me to identify and describe disparities in the socio-demographic characteristics and

composition of the host communities' member populations as they relate to the exposure to NPP-related risks.

First, in a descriptive study, I found that 3 out of 10 persons live in host communities that are located within a 50-mile radius of a NPP. This segment of the population accounts for more than 96 million people, or 32% of the total population, and includes a disproportionate number of people of color and people of lower socio-economic statuses. The latter conclusion is informed by descriptive statistics that show a higher percent of: people living below the federal poverty line, people living in renter-occupied housing units, people with a college degree or higher, the unemployed; host communities also include a lower percent of native-born U.S. citizens as compared to populations living in non-host communities more than 50 miles from a NPP. In a sample t-test I found that, as compared to the populations living in outlying areas, the communities within a 50-mile radius of a NPP as of 2010 included a higher percent Black, percent Asian and percent Color ; the difference was statistically significant at the $p<0.001$ level. Over the past 30 years, from 1990 to 2010, the disparity in the demographic composition of the respective areas has widened. In other words, there is an accelerating trend that sees a greater percent Black, percent Asian and percent Color being included among the populations living within a 50-mile radius of a NPP. Approximately half of the 65 U.S.-based commercial NPPs were hosted by communities comprised of populations that included higher percent values of people of Color, Black, Hispanic and Other. This implies that the people living in NPP host communities bear a disproportionately greater share of the potential environmental and health risks associated with the NPP and thus face environmental justice issues.

Second, in multivariate regression analyses conducted at the national, regional, urban/non-urban area and individual-NPP levels, OLS regression estimates revealed that select racial/ethnic variables—namely, percent Color, percent Black, percent Asian and percent Hispanic—as well as select socio-economic variables, including percent living below the federal poverty line, percent living in owner-occupied housing units and population density (LN), each bore a statistically significant association with the dependent variable distance (LN). In SAR analyses conducted at the individual-NPP level, when taking spatial autocorrelation into account, there was a decrease in the number of locations at which both racial/ethnic variables and socio-economic variables exhibited statistically significant associations with distance, with generally lower Moran's I values suggesting the presence of spatial autocorrelation problems. When taking spatial autocorrelation into account, there was a statistically significant relationship between distance from a NPP and the select socio-economic variables at only half of the 65 NPPs included in the present study. Having identified these spatial autocorrelation problems, I was also able to note the uneven distribution of risk between populations living in host communities and those living in non-host communities and can therefore assert that the people living in host communities face environmental justice issues. In other words, the more than 90 million people living in what are here defined as NPP host communities are exposed to a disproportionate share of the environmental and health risks associated with NPPs, regardless of their socio-economic or demographic characteristics.

Third, I constructed a potential risk index (PRI) for NPPs that takes into account the plants' day-to-day operational risks, hazard risks, and locational risks. Plant

operational risk includes radioactive effluents, near-miss events, and duration of operation, in years; hazard risks include hurricanes, seismic events, volcano and tornadoes; and, locational risks include plant location in crossed places. I ranked the composite index scores from highest to lowest and grouped them into four categories based on their percentile rank: (1) low risk, between 0 and 25th percentile; (2) moderate risk, between >25th and 50th percentile; (3) high risk, between >50th and 75th percentile; and, (4) very high risk, between >75th and 100th percentile. My examination of the discrepancies in the demographic characteristics of the populations of the host communities associated with NPPs of each of the four respective risk-level categories found that minority groups were more likely to be living with exposure to the highest levels of risk. Percent Hispanic and percent Other, in particular, showed the greatest percent change in both the period 1900–2000 and 2000–2010, implying that risk is unevenly distributed and that minority groups, including Black, Hispanic, Asian, and Other, were disproportionately more likely to be faced with environmental justice issues.

Fourth, I conducted a dose simulation exercise, using PVNGS, a NPP located in Arizona, about 45 miles from Phoenix. I used historical weather information to define the typical meteorological conditions for four discrete windows—January to March, April to June, July to September, and October to December—using the RASCAL computer program with the STDose model. This model allows the user to simulate the atmospheric dispersion of a radioactive plume and assess the level of the radiation dose that would be delivered if a NPP such as PVNGS were to encounter a core-meltdown accident. According to the simulations, the plume area was projected to cover anywhere from 3,000 square miles to an area as large as 6,000 square miles, depending on the time of

year at which the event occurred. More than half of all Arizonans were prone to exposure to the radioactive plume pathway. When I integrated the socio-demographic data from the 1990, 2000, and 2010 U.S. Census surveys with the meteorological data and the plume dispersion projections, I found that percent Color, percent Black, percent Hispanic, percent Asian, population density, percent living below the federal poverty line and percent living in owner-occupied housing units were each found to be influential in explaining the likelihood of exposure to radiation during a core-damage accident. These findings, taken together with the environmental justice notion that all populations have a right to equal protection from environmental and health hazards, led me to conclude that the at-risk population, which faces a disproportionate number and severity of environmental justice issues, consists of a higher percent Black, percent Asian, percent Hispanic, and percent Other.

Fifth, in connection to the simulations of a core-meltdown accident at PVNGS, I also conducted a study of the emergency planning and response plans and processes of the responsible Federal, state, local, tribal, and non-government organizations currently in place in the case of a nuclear power-related accident at PVNGS, in particular. I found that, although there were documents detailing the emergency planning and response process, the planning documents had not been developed into a formal process. I also found that the emergency response does not focus on mitigation, a pro-active approach common to the emergency management process that allows the at-risk population to mitigate their potential exposure to the affected areas by facilitating their movement to safe-haven places with sufficient lead time ahead of the actual event taking place. The emergency response plans that currently exist present a challenge to hazard assessment,

as well, which requires technical expertise in the use of the RASCAL computer program, and access to real-time field data collected from along the plume pathway in the immediate aftermath of the event. Absent the data generated by a rigorous hazard assessment process, it is unlikely that the responsible agencies would be able to generate an effective PAR, which is a vital input in making a PAD—a final document signed by the Governor of the State of Arizona or a Maricopa County Judge and placed in effect as a set of instructions for emergency evacuation during a core-meltdown accident or similar emergency. Overall, I found that the emergency evacuation and response planning process and end result did not maintain the relationship between documents on file, past training exercises, and the prescribed planning process that is based on the emergency evacuation and response plan prepared by the NRC. This document serves a master reference for all NPPs and is intended for use in all U.S. states that host a NPP. My findings identified duplicated efforts in the hazard assessment phase of the planning process, that there was an impractical timeframe allocated for the preparing of PARs and a PAD; that the existing disaster management documents were regarded as documents, and not as a process; and, that the findings from past training exercises had not been integrated into the current planning process. Taken together, these findings help to explain why the current disaster response and planning process remains ineffective and largely incapable of coping with an emergency on the scale of a core-meltdown accident at PVGNS. From an environmental justice perspective, the lack of a proper emergency and response plan for the evacuation of the at-risk population from the affected areas means that the people living in those areas are at the greatest risk of experiencing negative consequences—which, in the case of a nuclear power-related accident such as

the one simulated here, can easily include death. In other words, at-risk populations do not have equal access to protection from environmental and health hazards, and they therefore face environmental justice issues.

Sixth, the at-risk population considered in this study was identified based on the assumption that the affected area would be in line with the NRC's ingestion exposure pathway zone, which extends to a 50-mile radius around a NPP. I found that this ingestion exposure zone was not practical because, based on evidence collected in the aftermath of the catastrophe at the Fukushima Daiichi NPP, the plume can travel much farther than the specified distance of 50 miles. My simulations of core-meltdown accident at PVNGS stipulated 24 hours of radioactive material release, during which time the plume dispersed over a distance of 100 miles; it should be noted, however, that one limitation of RASCAL is that its maximum allowable distance is 100 miles. In one of the worst-case scenarios, more than half of Arizona's total population was exposed to the radioactive plume. In reality, then, the at-risk population could be said to be far larger than my current estimate of 96 million, or 32% of the total population of the U.S., meaning that the distribution of risk associated with nuclear power extends across the population at large.

Above all, I found that the environmental justice issues related to nuclear power are unique in the sense that the hazard itself is of a sort that could have unthinkable and irreversible effects on peoples' lives. The populations of host communities—again, roughly one-third of the entire U.S. population—face potential nuclear hazards that create environmental justice issues regardless of their precise socio-demographic characteristics.

8.2 Geographic and Social Equity

I earlier outlined and discussed a number of social theories, environmental justice theories and distributive justice theories that have the potential to shed light on how best to understand the environmental justice issues facing the host communities of the 65 U.S.-based commercial NPPs. Overall, my findings support the theories associated with environmental justice.

First, the findings do not support calls from contractarianists, egalitarians and libertarians, each of whom wish to see social justice realized via the equal distribution across society of goods and ills. It is obvious that the risks associated with nuclear power are not evenly distributed across all socio-demographic. In general, the populations living in host communities surrounding NPPs include a higher percent Black, Asian, Hispanic, and Other, as well as a higher percent of peoples with a low socio-economic status. This unequal distribution of the potential risks associated with NPPs is sufficient to contradict the notion of distributive justice.

Second, another dimension of distributive justice is the notion that all people should have equal access to protection from environmental and health hazards. This study's findings show that the current emergency and evacuation planning process offers little to no potential for equal protection from the aftereffects of a nuclear power-related accident. The study's findings of a lack of equal access to protection from nuclear power-related dangers therefore also contradict the notion of distributive justice.

Third, this study's findings suggest that environmental justice theorists need a new conceptualization and a new definition of environmental justice, one that will retain its relevance in the context of nuclear energy. Nuclear power-related accidents clearly do

not fit our limited definition of an accident, and the consequences are incalculable given the current state of scientific knowledge and the assumption of technological infallibility, when in fact many of the worst consequences were previously unknown and unintended and have the potential to contaminate the environment—including the air, foodstuffs, plants and animals—with radioactive toxins that could remain present for generations, impacting future generations (Beck, 1992). With as much as one-third of the total U.S. population prone to such enormous risks regardless of socio-demographic characteristics there are clearly massive environmental justice issues surrounding nuclear power. It should be noted, too, that the remaining two-thirds of the U.S. population have hardly managed to avoid those same risks, as the consequences of a nuclear power-related accident would be extreme and far-reaching. This study's findings therefore suggest to me that, when it comes to environmental justice issues having to do with nuclear energy, one may not need to consider the same socio-demographic differences as do other environmental justice studies concerning toxic inventories, as the risks associated with nuclear energy directly or indirectly affect people in all corners of the Earth. Location, time, racial minority subgroups, and socioeconomic status all are made irrelevant in terms of distributive justice as it relates to nuclear energy. The very presence of nuclear power plants on this Earth poses a risk of unknown and unintended consequences with incalculable ramifications for all peoples, present and future.

8.3 Future Research

This study's findings identified environmental justice issues related to and affecting the host communities of the 65 U.S.-based commercial NPPs. This study has sought to identify the socio-demographic characteristics of the people living in those host

communities and to assess their exposure to the risks associated with nuclear energy. Future research should focus on the health impacts of continued exposure to low-level radiation of the sort emitted by NPPs as part of their regular operation by examining the cancer rates in host communities.

8. 4 Policy Recommendations

This study's findings address each of the four research questions posed and thus affords a more complete understanding of the above-mentioned environmental justice issues associated with and facing the host communities of the 65 U.S.-based commercial NPPs. Based on these findings, it is possible to offer several public policy recommendations.

First, before making specific recommendations, I believe it is necessary above all else to provide avenues for stakeholders in nuclear power projects to express their concerns. The stakeholders in such projects include the government, the regulators, the NPP owners, nuclear safety advocates, pro-nuclear power advocates, scientists and the public.

Dr. Gregory B. Jaczko, former chairman of the NRC (2009–2012), has asserted that with current technology NPPs will not be able to withstand severe accidents (Jaczko, 2013). He has suggested that the U.S. should pause now, and take a moment to collect their breath. The country should take pride in having advanced the limits of nuclear technology and in its ability to advance the limits of safety. He described the ideal NPP as one that does not present such challenges, does not pose such a risk of accident or present the same types of problems with regard to the disposal of spent fuel. He has also asked a question to which he does not have an answer but that warrants reflection: "Why

do we continue to move forward with the technology that presents all of these weaknesses and pursue it without stopping?" (Jaczko, 2013).

Arnie Gundersen, a nuclear safety advocate with 40 years' experience in nuclear power engineering, asserted that federal- and state-level governments, business interest groups and the nuclear power industry at large should be forced to view the video footage of the recent accident at Japan's Fukushima NPP (Gundersen, (2013). In his view, being forced to watch video from Fukushima would have the effect of bringing home the fact to policymakers that such an accident could occur here in the U.S. However, policymakers will most likely continue believing that such an accident could only occur outside of the U.S., despite the very real truth that it is all too possible that it could occur here.

A group of four climate-change scientists— James Hansen, Ken Caldeira, Kerry Emanuel and Tom Wigley—recently sent an open letter calling on the global population and world leaders to voice their support for the continued development of safer nuclear power (CNN, 2013). In their letter, they voiced their concern that global energy consumption has continued its exponential increase and that, sooner rather than later, it will exceed the planet's ability to reverse the effects of carbon dioxide pollution. In my view, the potential harms deriving from even the safe, accident-free use of nuclear power outweigh the benefits in reducing carbon dioxide emissions and other forms of pollution. Radioactive pollution and the irreversible effects of radioactive contamination, as well as the problems associated with the safe transport and storage of radioactive waste, far outweigh carbon dioxide pollution.

Peter Bradford, a former member of the NRC and former chair of the Maine and New York Utility Regulatory Commission, has argued that there is no coming nuclear

renaissance—instead, the nuclear renaissance bubble will soon burst (Bradford, 2013). In his view, the notion that nuclear power can be a competing form of energy is finding less and less acceptance among energy policymakers because of the immense financial commitments associated with new plant construction and continued operation. It is his assertion that the remaining NPPs in operation in the U.S. will soon shut down of their own accord, due to those economic considerations.

Naoto Kan, the former prime minister of Japan and leader of the administration responsible for handling the aftermath of the Fukushima nuclear catastrophe, had previously said that there is no such accident that could negatively impact 50 million people short of a global war (Kan, 2013). His beliefs underwent a 180-degree change following the accident at Fukushima. Whereas in the past he had voiced his belief that nuclear technology could be safe if handled with care, he is now of the opinion that risk is inevitable. The only sure way to be rid of the risks associated with nuclear power is to be rid of nuclear power.

President Barack Obama has voiced a vision of nuclear energy as part of the "global energy mix", in his "Sustainable Energy for All Initiative" (Gerhardt, 2013). He said:

> The United States will continue to promote the safe and secure use of nuclear power worldwide through a variety of bilateral and multilateral engagements. For example, the U.S. Nuclear Regulatory Commission advises international partners on safety and regulatory best practices, and the Department of Energy works with international partners on research

> and development, nuclear waste and storage, training, regulations, quality control, and comprehensive fuel leasing options. Going forward, we will expand these efforts to promote nuclear energy generation consistent with maximizing safety and nonproliferation goals. (Barack Obama, as cited in (Gerhardt, 2013)

The president's remarks show his vision of nuclear power to be exactly in line with the vision previously voiced by President Eisenhower, some 60 years prior, when he launched the Atoms for Peace program:

> The more important responsibility of this Atomic Energy Agency would be to devise methods whereby this fissionable material would be allocated to serve the peaceful pursuits of mankind. Experts would be mobilized to apply atomic energy to the needs of agriculture, medicine, and other peaceful activities. A special purpose would be to provide abundant electrical energy in the power-starved areas of the world. Thus the contributing powers would be dedicating some of their strength to serve the needs rather than the fears of mankind. (Eisenhower, 1953)

A poll conducted by CBS, an American broadcast-television station, distributed a survey measuring U.S. public opinion of nuclear power in light of the recent nuclear disaster in Japan. The survey showed that 50% of Americans were the opposed to building new nuclear plants, an increase from 34% as of 2008. In addition, the poll

showed that 62% of Americans objected to the construction of a NPP anywhere near their communities (Madrigal, 2011). Further, the Price-Anderson Act of 1957 required that taxpayers cover virtually all of the costs in the event of a core-damage accident occurring at a U.S.-based NPP (Huffington Post, 2013). In addition, nuclear power is seen as unnecessary, uneconomic, uninsurable, and unsafe. The age of the existing fleet of U.S.-based commercial NPPs is also a concern, reflected in the use of the term "zombie nukes" (Gerhardt, 2013).

As a researcher as well as a stakeholder, I have sought to provide additional information of the sort that other stakeholders may not possess or be able to access. The findings of this study will prove useful in future decision-making processes. Given the findings presented here, I suggest that American citizens take responsibility and insist on accountability by exercising their basic, fundamental and constitutional right to the freedom of expression. This right must not be taken for granted, as it is up to the citizenry to decide the country's future. The existing fleet of U.S.-based NPPs is, in effect, a ticking time bomb, one that has to be addressed as soon as possible. I strongly believe that all Americans, given the choice, would opt to create a safe and sustainable future.

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APPENDIX A

GENERAL NOTES

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Table A.1
Construction of Study Variables

Category	1990 Census (SF3)	2000 Census (SF3)	2010 CAS 5 year estimate
Race/Ethnicity			
Total population	Total population (P0010001)	Total population (P006001)	Total population (B01001_2)
% White	White(P0080001)/Total population*100	White(P006002)/Total population*100	White(B02001_2)/Total population*100
% Black	Black(P0080002)/Total population*100	Black(P006003)/Total population*100	Black(B02001_3)/Total population*100
% Asian	Asia-Pacific(P0080004)/Total population*100	Asia-Pacific(P006005-6)/Total population*100	Asia-Pacific(B02001_5, B02001_6)/Total population*100
% Native American	Native American(P0080003)/Total population*100	Native American(P006004)/Total population*100	Native American(B02001_4)/Total population*100
% Others	Other race(P0080005)/Total population*100	Other race(P006007-8)/Total population*100	Other race(B02001_7, B02001_8)/Total population*100
% Hispanic	Total persons of Hispanic origin(P0100001)/Total population*100	Total persons of Hispanic origin(P007010)/Total population*100	Total persons of Hispanic origin(B03002_12)/Total population*100
% Color	Total population(P0010001)-Not Hispanic origin, White(P0120001)/Total population*100	Total population(P006001)-Not Hispanic origin, White(P007003)/Total population*100	Total population(B01001_2)-Not Hispanic origin, White(B03002_3)/Total population*100
Households			
Mean household income ($)	Aggregate household income (P0810001-2)/Total household (P0050001)*100	Aggregate household income (P054001) / Total household (P014001)*100	Aggregate household income (B19025_1)/Total household (B11001_1)*100
Poverty			
Poverty rate	Individuals below poverty threshold (P1170013-24)/Total population poverty determined (P1170001-12)*100	Individuals below poverty threshold (P08002)/Total population poverty determined (P087001)*100	Individuals below poverty threshold (B17001_2)/Total population poverty determined (B17001_1)*100
Housing			
Occupancy rate	Occupied housing units (H0040001) / Total housing units (H0010001)*100	Occupied housing units (H006002) / Total housing units (H001001)*100	Occupied housing units (B25002_2) / Total housing units (B25001_1)*100
Vacant rate	Vacant housing units(H0040002) / Total housing units(H0010001)*100	Vacant housing units(H006003) / Total housing units(H001001)*100	Vacant housing units(B25002_3) / Total housing units(B25001_1)*100
% Owner occupied housing units	Owner occupied housing units (H0080001) /Total housing units (H0010001) *100	Owner occupied housing units (H007002) /Total housing units (H001001) *100	Owner occupied housing units (B25003_2) /Total housing units (B25001_1) *100
% Renter occupied housing units	Renter occupied housing units (H0080002) / Total housing units (H0010001) *100	Renter occupied housing units (H007003) / Total housing units (H001001) *100	Renter occupied housing units (B25003_3) / Total housing units (B25001_1) *100
Unemployment			
% Unemployment rate	Unemployed population (P0700003+P0700007)/Civilian employed population(P0700002-3,P0700006-7)*100	Unemployed population (P043007+P043014)/Civilian employed population(P043005,P043012)*100	Unemployed population (B23001_8,15,22,29,36,43,50,57,64,71,76,81,86,94,101,108,115,122,129,136,143,150,157,162,167,172)/Civilian employed population(unemployed, B23001_7,14,21,28,35,42,49,56,63,70,75,80,85,93,100,107,114,121,128,135,142,149,156,161,166,171)

Table A.2

List of states included among the outlying areas surrounding individual NPPs

Index	Plant	Primary state	Adjacent State 1	Adjacent State 2	Adjacent State 3
1	Browns Ferry Nuclear Plant	Alabama	Tennessee		
2	Joseph M. Farley Nuclear Plant	Alabama	Florida	Georgia	
3	Palo Verde Nuclear Generating Station	Arizona			
4	Arkansas Nuclear One	Arkansas			
5	Diablo Canyon Nuclear Power Plant	California			
6	San Onofre Nuclear Generating Station	California			
7	Millstone Power Station	Connecticut	New York	Rhode Island	
8	Crystal River Nuclear Generating Plant	Florida			
9	St. Lucie Plant	Florida			
10	Turkey Point Nuclear Generating	Florida			
11	Edwin I. Hatch Nuclear Plant	Georgia			
12	Vogtle Electric Generating Plant	Georgia	Georgia	South Carolina	
13	Braidwood Station	Illinois			
14	Byron Station	Illinois	Wisconsin		
15	Clinton Power Station	Illinois			
16	Dresden Nuclear Power Station	Illinois			
17	LaSalle County Station	Illinois			
18	Quad Cities Nuclear Power Station	Illinois	Iowa		
19	Duane Arnold Energy Center	Iowa			
20	Wolf Creek Generating Station	Kansas			
21	River Bend Station	Louisiana	Mississippi		
22	Waterford Steam Electric Station	Louisiana			
23	Calvert Cliffs Nuclear Power Plant	Maryland	District of Columbia	Virginia	
24	Pilgrim Nuclear Power Station	Massachusetts	Rhode Island		
25	Donald C. Cook Nuclear Power Plant	Michigan	Indiana		
26	Fermi	Michigan	Ohio		
27	Palisades Nuclear Plant	Michigan	Indiana		
28	Monticello Nuclear Generating Plant	Minnesota			
29	Prairie Island Nuclear Generating Plant	Minnesota	Wisconsin		
30	Grand Gulf Nuclear Station	Mississippi	Louisiana		
31	Callaway Plant	Missouri			
32	Cooper Nuclear Station	Nebraska	Iowa	Kansas	Maryland
33	Fort Calhoun Station	Nebraska	Iowa		
34	Seabrook Station	New Hampshire	Maine	Massachusetts	
35	Hope Creek Generating Station	New Jersey	Delaware	Maryland	
36	Oyster Creek Nuclear Generating Station	New Jersey	New York	Pennsylvania	
37	Salem Nuclear Generating Station	New Jersey	Delaware	Maryland	Pennsylvania
38	Indian Point Nuclear Generating	New York	Connecticut	New Jersey	
39	James A. FitzPatrick Nuclear Power Plant	New York			
40	Nine Mile Point Nuclear Station	New York			
41	R.E. Ginna Nuclear Power Plant	New York			
42	Brunswick Steam Electric Plant	North Carolina	South Carolina		
43	McGuire Nuclear Station	North Carolina	South Carolina		
44	Shearon Harris Nuclear Power Plant	North Carolina			
45	Davis-Besse Nuclear Power Station	Ohio	Michigan		
46	Perry Nuclear Power Plant	Ohio	Pennsylvania		
47	Beaver Valley Power Station	Pennsylvania	Ohio	West Virginia	
48	Limerick Generating Station	Pennsylvania	Delaware	New Jersey	
49	Peach Bottom Atomic Power Station	Pennsylvania	Delaware	Maryland	
50	Susquehanna Steam Electric Station	Pennsylvania			
51	Three Mile Island Nuclear Station	Pennsylvania	Maryland		
52	Catawba Nuclear Station	South Carolina	North Carolina		
53	H. B. Robinson Steam Electric Plant	South Carolina	North Carolina		
54	Oconee Nuclear Station	South Carolina	Georgia	North Carolina	
55	Virgil C. Summer Nuclear Station	South Carolina			
56	Sequoyah Nuclear Plant	Tennessee	Alabama	Georgia	
57	Watts Bar Nuclear Plant	Tennessee	Georgia		
58	Comanche Peak Steam Electric Station	Texas			
59	South Texas Project	Texas			
60	Vermont Yankee Nuclear Power Plant	Vermont	Massachusetts	New Hampshire	
61	North Anna Power Station	Virginia	Maryland		
62	Surry Nuclear Power Station	Virginia	North Carolina		
63	Columbia Generating Station	Washington	Oregon		
64	Kewaunee Power Station	Wisconsin			
65	Point Beach Nuclear Plant	Wisconsin			

Table A.3
Study variables of US demographic characteristics in 1990, 2000, and 2010

	US_1990	US_2000	US_2010
Tract	73,057	73,057	73,057
Tract area (sq. mile)	3,796,743	3,796,743	3,796,743
Total population	248,709,360	281,421,920	303,965,280
White	199,826,608	211,353,728	224,895,696
Black	29,930,428	34,361,740	37,978,752
Asian	7,226,882	10,550,602	14,677,166
Native American	2,015,044	2,447,989	2,480,465
Others	9,710,097	22,707,850	23,933,188
Hispanic	21,900,100	35,238,480	47,727,532
Color	60,284,992	86,907,768	107,392,496
White (%)	80.35	75.10	73.99
Black (%)	12.03	12.21	12.49
Asian (%)	2.91	3.75	4.83
Native American (%)	0.81	0.87	0.82
Others (%)	3.90	8.07	7.87
Hispanic (%)	8.81	12.52	15.70
Color (%)	24.24	30.88	35.33
Female (%)	51.28	50.99	50.85
Old (65 + years) (%)	12.54	12.43	12.75
Kid (< 5 years) (%)	8.83	8.18	6.62
Native-born (%)	92.05	88.95	87.28
Renter housing units (%)	32.19	30.77	29.33
College degree or higher (%)	20.34	24.40	27.90
Unemployment (%)	6.31	5.77	7.92
Poverty (%)	13.12	12.38	13.82
Mean household income ($)	63,119	70,570	70,881

Index	Plant Name, Reactor	
D1	Humboldt Bay Nuclear Power Plant, Humboldt Bay 3	
D2	Rancho Seco Nuclear Generating Station, Rancho Seco	
D3	San Onofre Nuclear Generating Station, Unit 1	*
D4	Fort Saint Vrain Generating Station, Fort St. Vrain	
D5	Connecticut Yankee, Haddam Neck	*
D6	Millstone Power Station, Unit 1	*
D7	Dresden Nuclear Power Station, Unit 1	
D8	Zion Nuclear Power Station, Zion 1 & 2	#
D9	Maine Yankee Nuclear Power Plant, Maine Yankee	
D10	Yankee-Rowe Nuclear Power Station, Yankee-Rowe	
D11	Big Rock Point Nuclear Plant (Monticello)	
D12	Fermi, Unit 1	
D13	Indian Point Nuclear Generating, Unit 1	*
D14	Shoreham Nuclear Power Station, Shoreham	*
D15	Trojan Nuclear Power Plant, Trojan	
D16	Peach Bottom Atomic Power Station, Unit 1	
D17	Saxton	*
D18	Three Mile Island Nuclear Station, Unit 2	
D19	Pathfinder Atomic Plant, Pathfinder	*
D20	La Crosse Nuclear Generating Station, La Crosse	

Note: * Located in currently operating nuclear power plant site.
Entire plant site with the two reactors was permanently shut down.

Figure A.1. Permanently decommissioned U.S.-based commercial NPPs (U.S. NRC, (2012b).

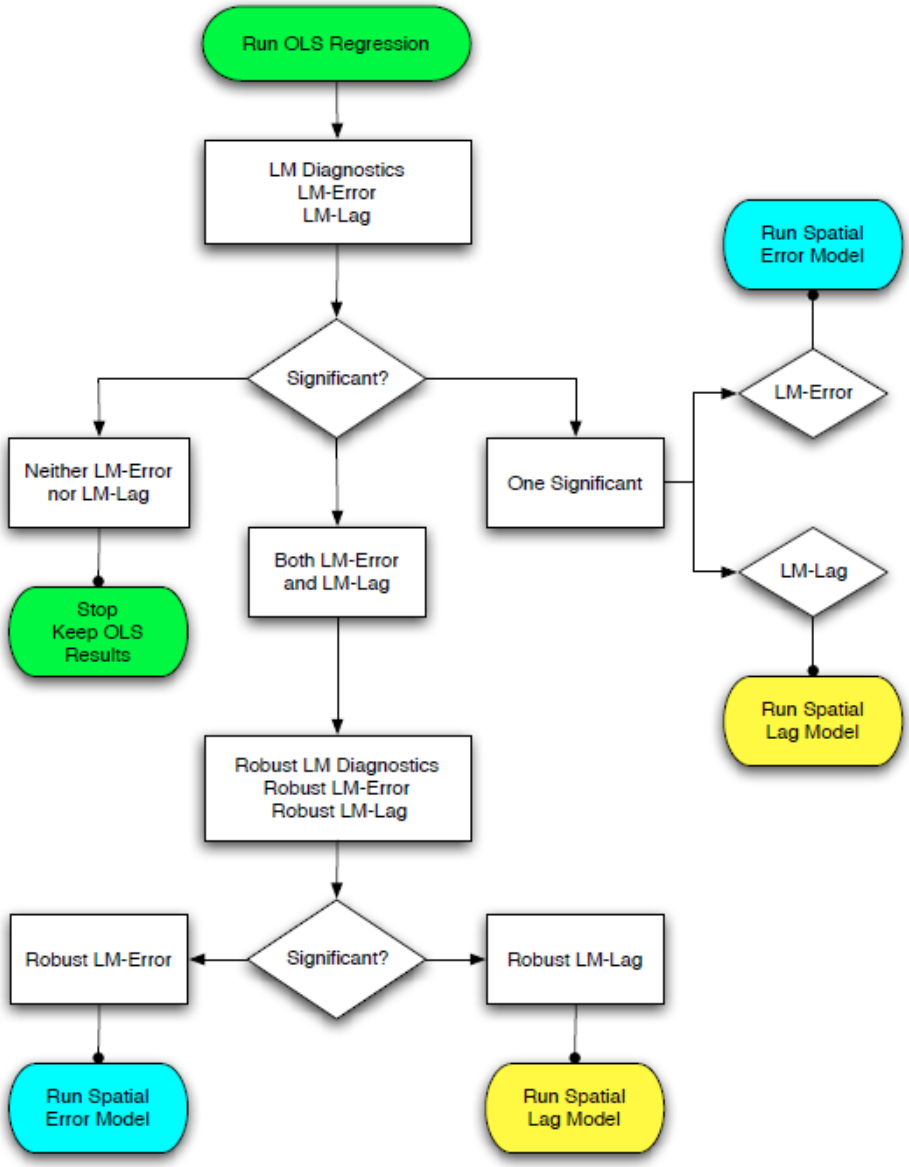

Figure A.2. Spatial regression decision process (Anselin, 2005)

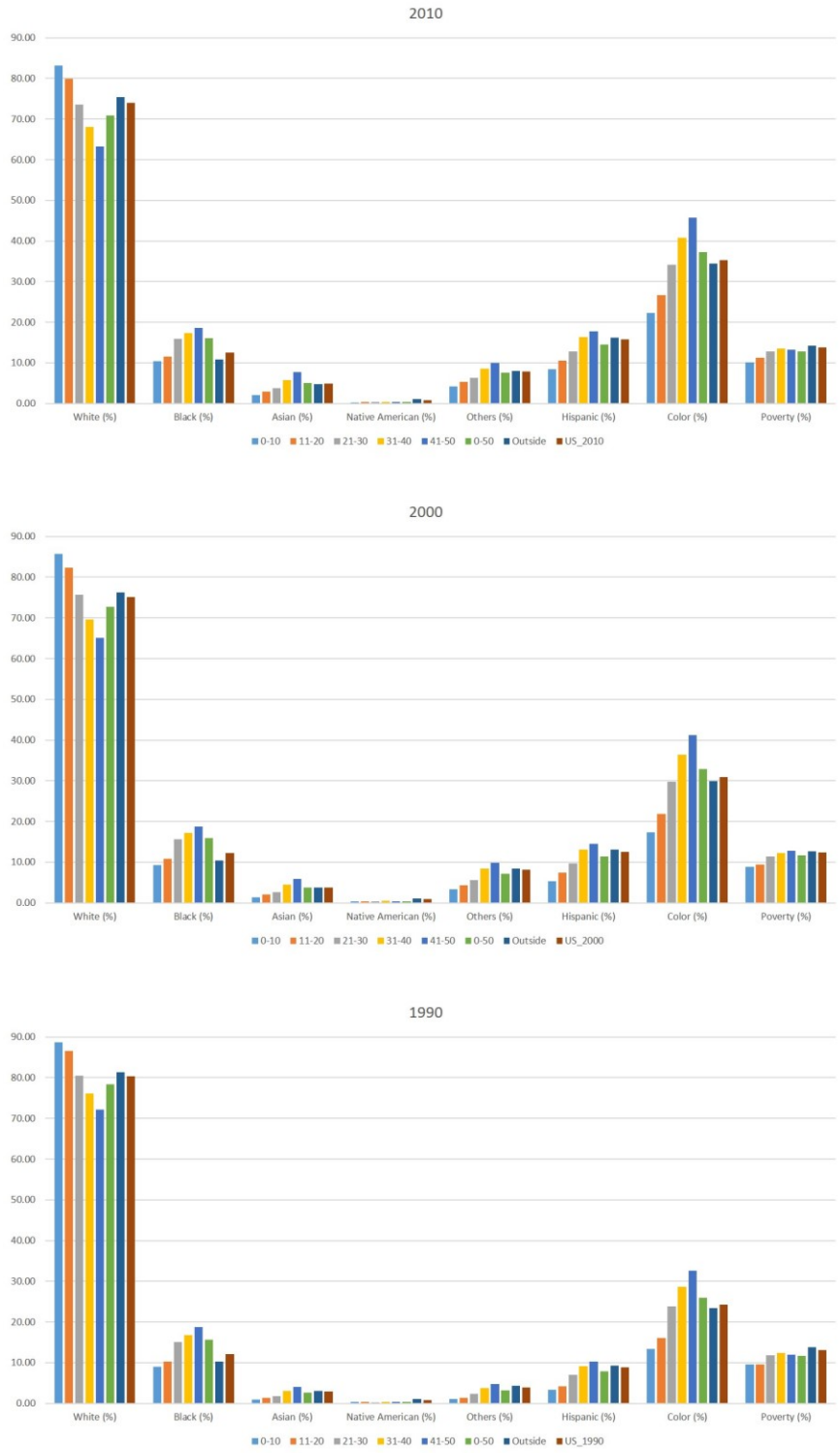

Figure A.3. Percent demographic characteristics by distance in 1990, 2000, and 2010

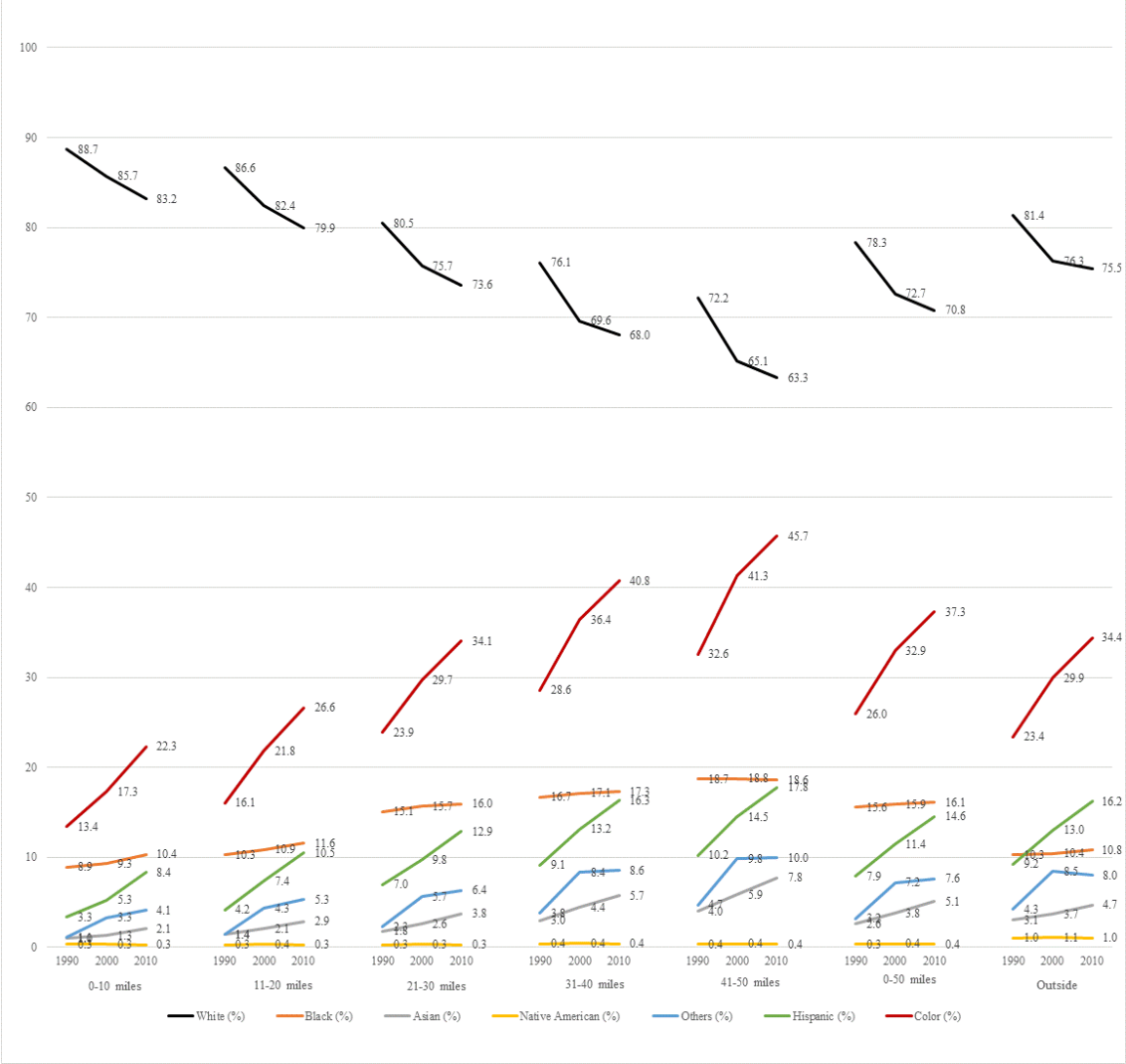

Figure A.4 Demographic trends (race/ethnicity) in the areas surrounding any one of the 65 U.S.-based commercial NPPs, as sorted by distance.

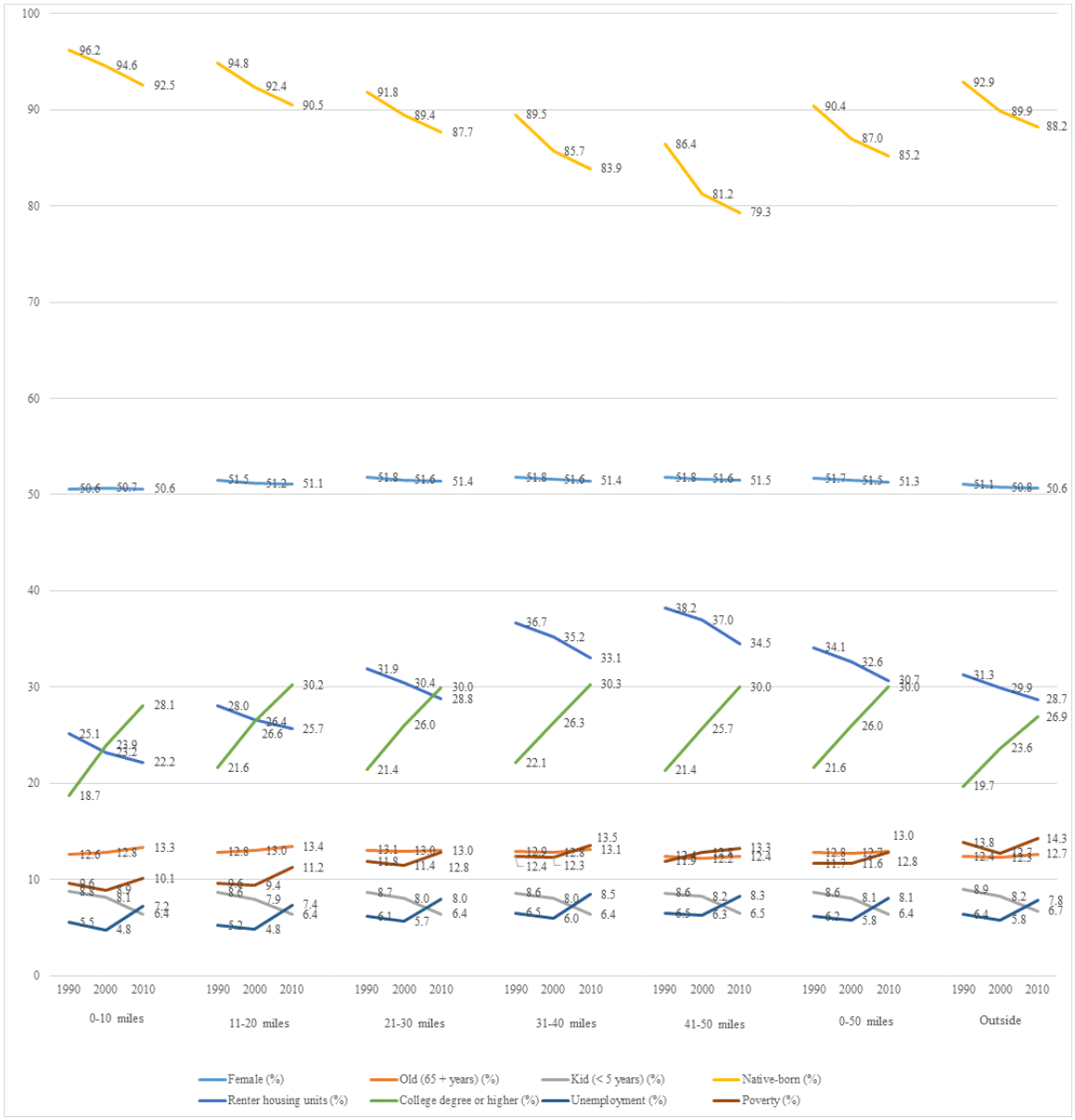

Figure A.5 Demographic trends in the areas surrounding any one of the 65 U.S.-based commercial NPPs, as sorted by distance.

Table A.4

Demographic Composition of Host Communities (within a 50-mile Radius of Any One of 65 US Commercial NPPs) Compared to Non-Host Communities (Outside Areas) sorted by Region. Based on 2000 American Community Survey Data Normalized to 2010 Census Boundaries.

	West		Midwest		South		Northeast	
Demographic	0-50	Outside	0-50	Outside	0-50	Outside	0-50	Outside
Tracts	1,763	14,354	5,414	11,679	6,834	19,474	9,384	4,155
Tract area	18,272	1,854,981	89,649	732,074	138,327	782,118	54,552	126,769
Total population	7,498,674	55,699,256	20,355,738	44,037,040	25,684,650	74,552,168	37,056,972	16,537,406
White	5,007,366	38,202,740	16,011,656	37,811,640	17,916,372	54,881,808	26,882,810	14,639,329
Black	257,079	2,749,585	2,808,479	3,626,938	6,209,406	12,678,769	5,158,279	873,205
Asian	743,108	4,531,555	508,319	691,533	419,275	1,522,406	1,778,034	356,372
Native American	62,241	1,093,094	82,028	326,256	106,787	618,140	105,070	54,373
Others	1,428,804	9,122,359	945,246	1,580,680	1,032,854	4,851,001	3,132,741	614,165
Hispanic	2,225,214	13,112,082	1,208,357	1,896,205	2,502,976	9,049,170	4,426,574	817,903
Color	3,439,805	22,902,342	4,905,376	7,086,975	9,512,884	24,794,420	11,973,366	2,292,598
White (%)	66.78	68.59	78.66	85.86	69.76	73.62	72.54	88.52
Black (%)	3.43	4.94	13.80	8.24	24.18	17.01	13.92	5.28
Asian (%)	9.91	8.14	2.50	1.57	1.63	2.04	4.80	2.15
Native Ame. (%)	0.83	1.96	0.40	0.74	0.42	0.83	0.28	0.33
Others (%)	19.05	16.38	4.64	3.59	4.02	6.51	8.45	3.71
Hispanic (%)	29.67	23.54	5.94	4.31	9.75	12.14	11.95	4.95
Color (%)	45.87	41.12	24.10	16.09	37.04	33.26	32.31	13.86
Renter units (%)	33.75	35.66	27.46	27.23	28.52	28.33	38.11	26.61
Education (%)	27.58	26.05	24.80	22.04	22.73	22.48	28.56	24.99
Unemployed (%)	5.69	6.56	5.15	5.07	5.75	5.71	6.13	5.46
Poverty (%)	11.02	13.30	9.62	10.41	12.93	14.27	11.99	9.98
Mean Income ($)	84,655	74,551	73,703	66,068	66,547	64,883	80,087	71,290

Note: Distance was measured between census-tract centroid points and NPP, in miles.

Table A.5

Demographic Composition of Host Communities (within a 50-mile Radius of Any One of 65 US Commercial NPPs) Compared to Non-Host Communities (Outside Areas) sorted by Region. Based on 1990 American Community Survey Data Normalized to 2010 Census Boundaries.

	West		Midwest		South			Northeast
Demographic	0-50	Outside	0-50	Outside	0-50	Outside	0-50	0-50
Tracts	1,763	14,354	5,414	11,679	6,834	19,474	9,384	4,155
Tract area	18,272	1,854,981	89,649	732,074	138,327	782,118	54,552	126,769
Total population	6,149,040	46,637,040	18,867,540	40,800,880	22,144,744	63,301,104	34,913,312	15,895,696
White	4,830,767	35,237,964	15,775,584	36,265,520	16,252,987	49,364,056	27,404,032	14,695,696
Black	203,991	2,605,901	2,439,624	3,261,129	5,265,913	10,547,090	4,866,167	740,613
Asian	478,577	3,568,965	301,301	456,234	259,562	841,813	1,103,673	216,757
Native American	47,741	902,037	74,867	275,780	78,288	511,955	77,325	47,051
Others	587,939	4,322,135	276,152	542,097	288,076	2,036,086	1,461,991	195,621
Hispanic	1,315,067	8,625,650	570,683	1,089,078	1,471,618	5,189,668	3,143,910	494,427
Color	2,017,725	15,449,898	3,374,496	5,056,371	7,019,190	16,998,700	8,889,950	1,478,663
White (%)	78.56	75.56	83.61	88.88	73.39	77.98	78.49	92.45
Black (%)	3.32	5.59	12.93	7.99	23.78	16.66	13.94	4.66
Asian (%)	7.78	7.65	1.60	1.12	1.17	1.33	3.16	1.36
Native Ame. (%)	0.78	1.93	0.40	0.68	0.35	0.81	0.22	0.30
Others (%)	9.56	9.27	1.46	1.33	1.30	3.22	4.19	1.23
Hispanic (%)	21.39	18.50	3.02	2.67	6.65	8.20	9.00	3.11
Color (%)	32.81	33.13	17.89	12.39	31.70	26.85	25.46	9.30
Renter units (%)	34.72	37.42	29.50	28.86	30.65	29.50	38.71	27.36
Education (%)	24.68	22.40	19.90	17.71	18.64	18.76	23.75	20.75
Unemployed (%)	5.45	6.58	6.42	6.11	5.87	6.43	6.40	6.20
Poverty (%)	9.51	13.02	11.04	12.46	13.89	16.36	10.99	9.62
Mean income ($)	81,622	66,969	64,617	57,271	59,533	56,465	74,201	66,059

Note: Distance was measured between census-tract centroid points and NPP, in miles.

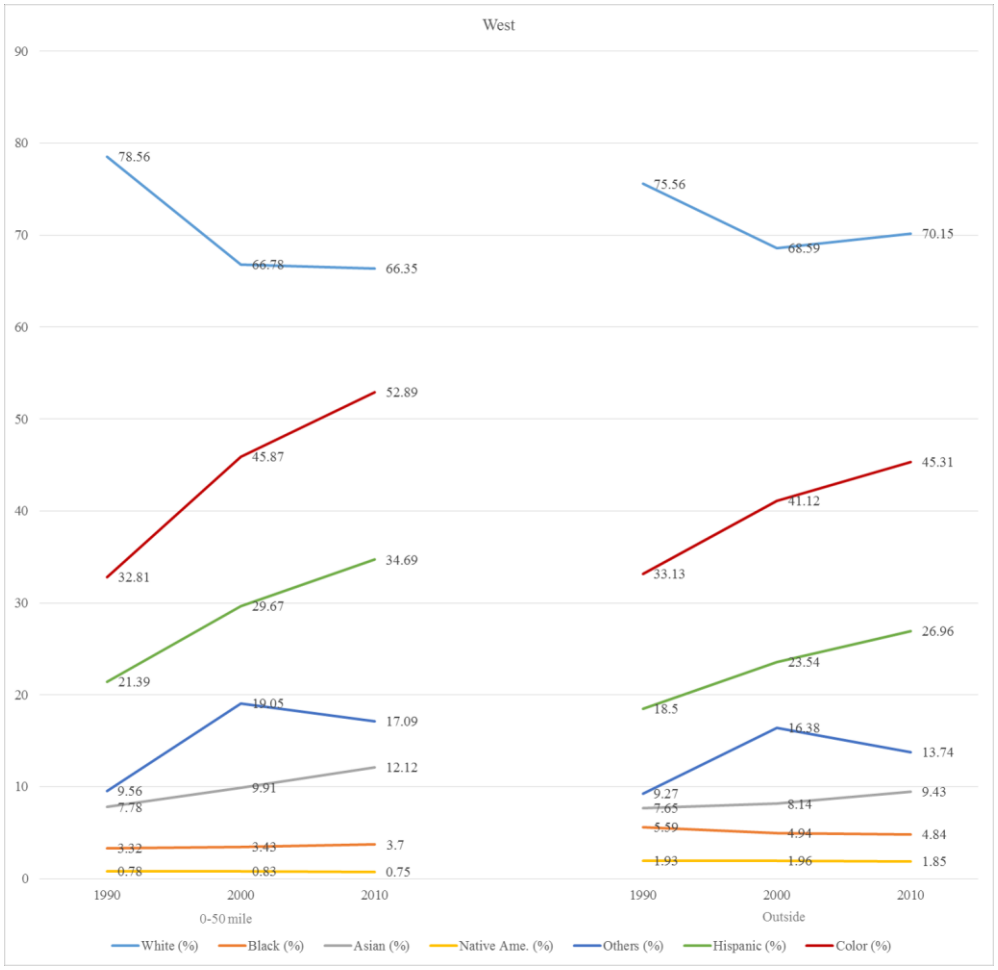

Figure A.6 Demographic trends among populations living within a 50-mile radius of a commercial NPP in the U.S. West region from 1990 to 2000 to 2010.

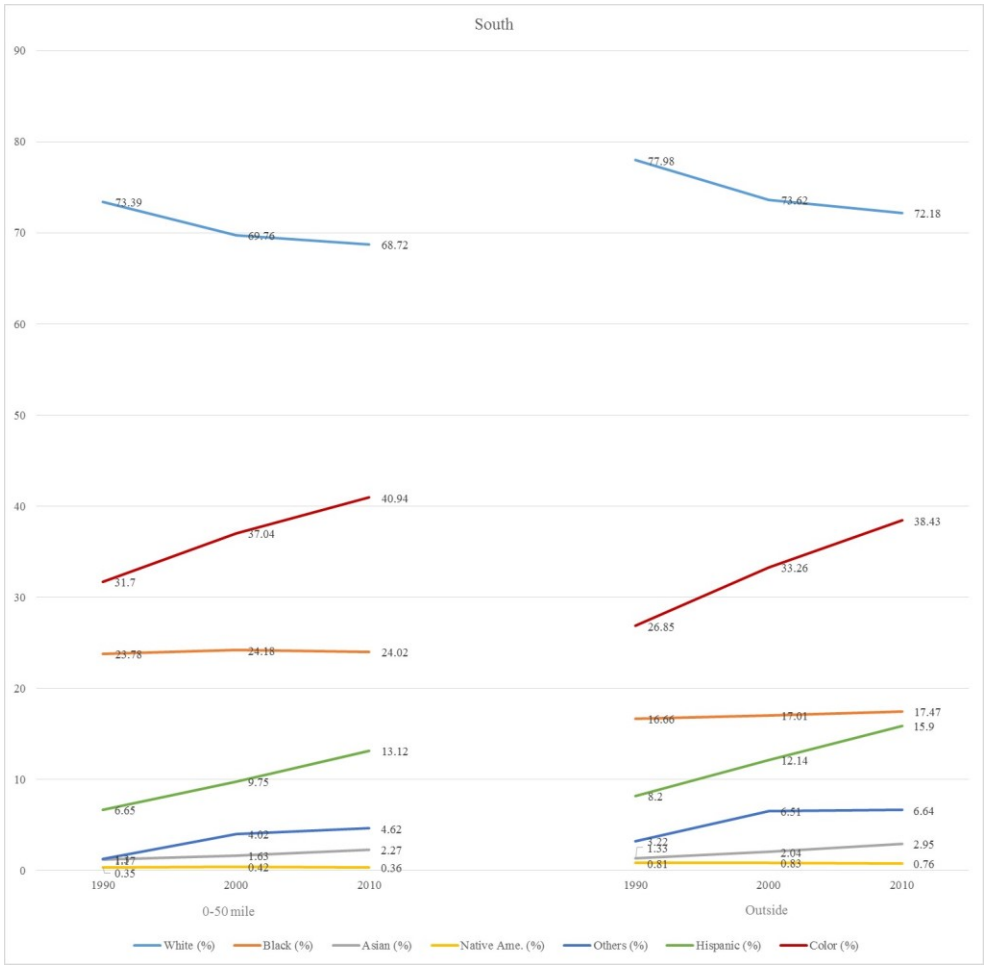

Figure A.7 Demographic trends among populations living within a 50-mile radius of a commercial NPP in the U.S. South region from 1990 to 2000 to 2010.

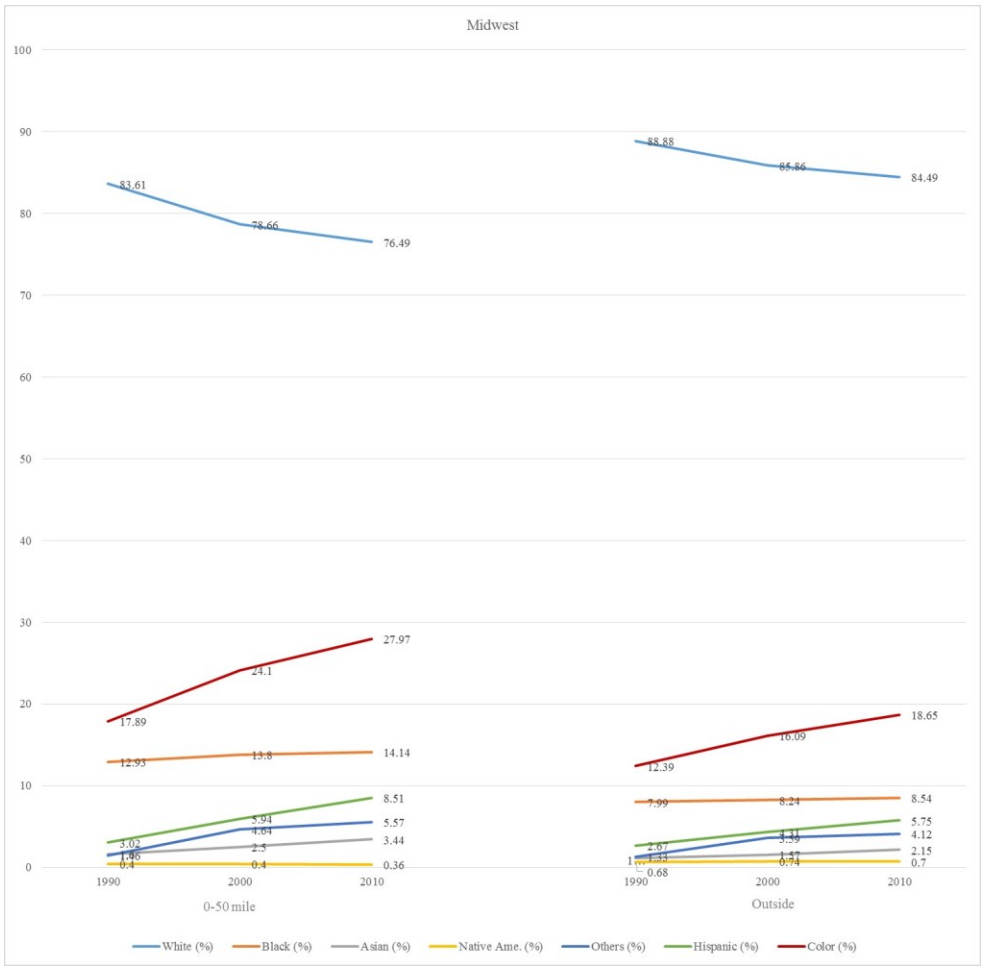

Figure A.8 Demographic trends among populations living within a 50-mile radius of a commercial NPP in the U.S. Midwest region from 1990 to 2000 to 2010.

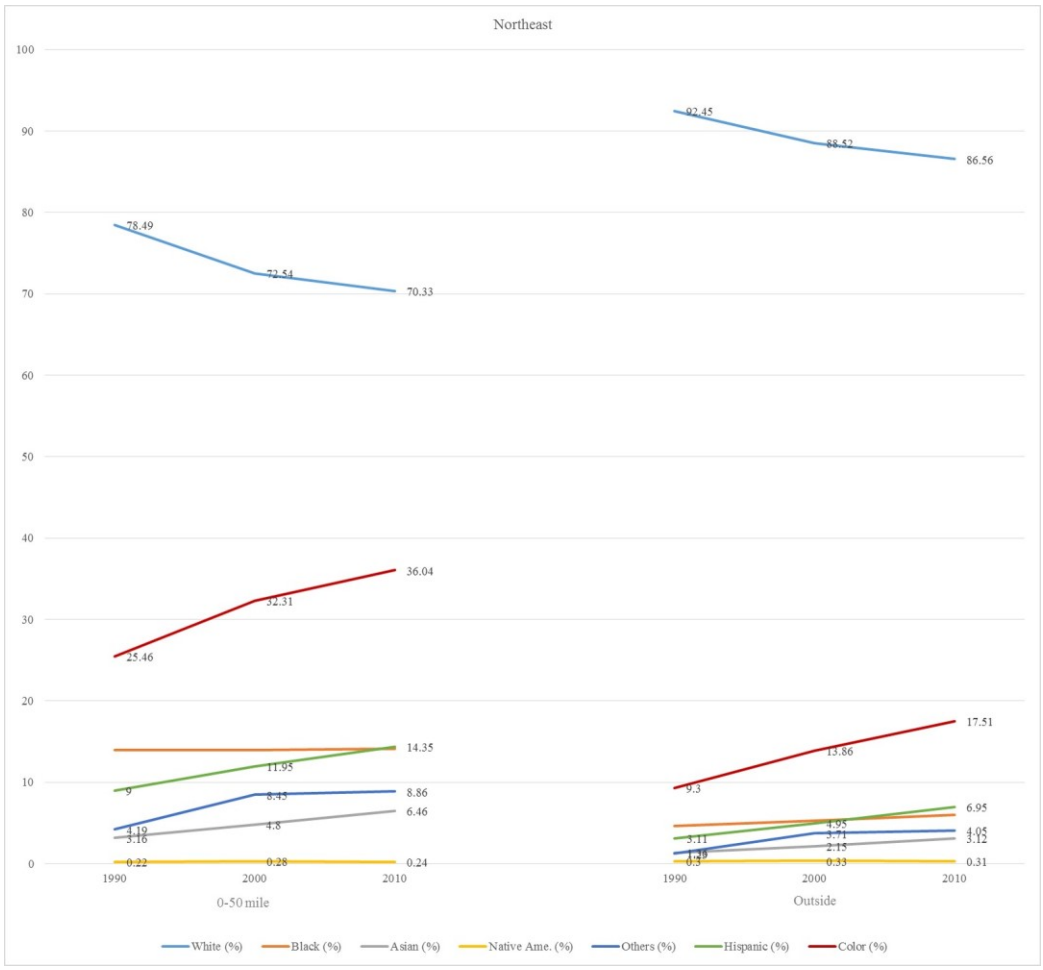

Figure A.9 Demographic trends among populations living within a 50-mile radius of a commercial NPP in the U.S. Northeast region from 1990 to 2000 to 2010.

Table A.6

Total Population Living in Census Tracts within a 10-Mile and a 50-Mile Radius of a NPP as of 2000, as Measured from Census Tract Centroid Point to NPP

Index	State	Plant	10-mile	10-mile rank	50-mile	50-mile rank
1	Alabama	Browns Ferry Nuclear Plant	38,640	32	812,964	41
2	Alabama	Joseph M. Farley Nuclear Plant	15,882	53	343,659	57
3	Arizona	Palo Verde Nuclear Generating Station	2,112	65	1,799,929	19
4	Arkansas	Arkansas Nuclear One	37,734	33	182,869	63
5	California	Diablo Canyon Nuclear Power Plant	40,444	28	409,562	55
6	California	San Onofre Nuclear Generating Station	91,169	13	6,057,255	3
7	Connecticut	Millstone Power Station	115,203	10	1,589,650	26
8	Florida	Crystal River Nuclear Generating Plant	18,941	48	697,740	47
9	Florida	St. Lucie Plant	157,349	4	930,833	33
10	Florida	Turkey Point Nuclear Generating	99,529	12	3,024,321	11
11	Georgia	Edwin I. Hatch Nuclear Plant	10,524	59	284,616	60
12	Georgia	Vogtle Electric Generating Plant	7,929	62	587,317	49
13	Illinois	Braidwood Station	32,863	35	2,718,397	13
14	Illinois	Byron Station	22,901	44	773,547	42
15	Illinois	Clinton Power Station	13,049	55	577,409	50
16	Illinois	Dresden Nuclear Power Station	54,839	22	4,433,036	5
17	Illinois	LaSalle County Station	11,165	56	886,835	35
18	Illinois	Quad Cities Nuclear Power Station	32,764	36	547,635	51
19	Iowa	Duane Arnold Energy Center	90,277	15	510,461	52
20	Kansas	Wolf Creek Generating Station	8,865	61	140,997	64
21	Louisiana	River Bend Station	18,311	50	737,814	45
22	Louisiana	Waterford Steam Electric Station	67,869	18	1,778,252	22
23	Maryland	Calvert Cliffs Nuclear Power Plant	48,206	26	1,605,592	25
24	Massachusetts	Pilgrim Nuclear Power Station	66,086	19	3,078,452	10
25	Michigan	Donald C. Cook Nuclear Power Plant	53,837	24	861,818	38
26	Michigan	Fermi	82,873	16	4,542,979	4
27	Michigan	Palisades Nuclear Plant	34,594	34	882,586	36
28	Minnesota	Monticello Nuclear Generating Plant	42,437	27	1,781,553	21
29	Minnesota	Prairie Island Nuclear Generating Plant	24,295	41	1,686,829	23
30	Mississippi	Grand Gulf Nuclear Station	14,443	54	218,887	61
31	Missouri	Callaway Plant	10,726	58	357,726	56
32	Nebraska	Cooper Nuclear Station	10,205	60	115,868	65
33	Nebraska	Fort Calhoun Station	17,820	52	813,760	40
34	New Hampshire	Seabrook Station	117,140	8	3,683,764	9
35	New Jersey	Hope Creek Generating Station	40,224	30	4,189,795	6
36	New Jersey	Oyster Creek Nuclear Generating Station	114,293	11	2,387,006	14
37	New Jersey	Salem Nuclear Generating Station	40,224	31	4,147,881	7
38	New York	Indian Point Nuclear Generating	242,165	1	14,894,006	1
39	New York	James A. FitzPatrick Nuclear Power Plant	29,878	39	745,522	43
40	New York	Nine Mile Point Nuclear Station	29,878	40	742,377	44
41	New York	R.E. Ginna Nuclear Power Plant	59,508	20	1,020,186	32
42	North Carolina	Brunswick Steam Electric Plant	18,639	49	316,773	58
43	North Carolina	McGuire Nuclear Station	117,264	7	2,072,499	15
44	North Carolina	Shearon Harris Nuclear Power Plant	54,745	23	1,829,822	17
45	Ohio	Davis-Besse Nuclear Power Station	23,501	43	1,354,016	27
46	Ohio	Perry Nuclear Power Plant	75,998	17	1,788,572	20
47	Pennsylvania	Beaver Valley Power Station	115,882	9	2,757,925	12
48	Pennsylvania	Limerick Generating Station	222,564	2	6,282,721	2
49	Pennsylvania	Peach Bottom Atomic Power Station	40,396	29	3,845,576	8
50	Pennsylvania	Susquehanna Steam Electric Station	53,318	25	1,116,488	29
51	Pennsylvania	Three Mile Island Nuclear Station	177,279	3	1,906,037	16
52	South Carolina	Catawba Nuclear Station	137,392	5	1,819,689	18
53	South Carolina	H. B. Robinson Steam Electric Plant	32,295	37	616,110	48
54	South Carolina	Oconee Nuclear Station	58,346	21	1,031,201	31
55	South Carolina	Virgil C. Summer Nuclear Station	18,174	51	865,550	37
56	Tennessee	Sequoyah Nuclear Plant	90,338	14	855,343	39
57	Tennessee	Watts Bar Nuclear Plant	22,704	45	731,267	46
58	Texas	Comanche Peak Steam Electric Station	23,844	42	1,050,191	30
59	Texas	South Texas Project	2,848	64	215,547	62
60	Vermont	Vermont Yankee Nuclear Power Plant	31,723	38	910,822	34
61	Virginia	North Anna Power Station	19,529	47	1,322,489	28
62	Virginia	Surry Nuclear Power Station	121,515	6	1,645,196	24
63	Washington	Columbia Generating Station	4,364	63	302,914	59
64	Wisconsin	Kewaunee Power Station	10,931	57	465,178	53
65	Wisconsin	Point Beach Nuclear Plant	20,819	46	461,723	54
		Total population living nearby areas	3,462,639		90,596,034	
		Total population living outside areas	302,900,220		190,825,872	
		Total population in US	306,362,859		281,421,906	

Table A.7

Total Population Living in Census Tracts within a 10-Mile and a 50-Mile Radius of a NPP as of 1990, as Measured from Census Tract Centroid Point to NPP

Index	State	Plant	10-mile	10-mile rank	50-mile	50-mile rank
1	Alabama	Browns Ferry Nuclear Plant	36,259	26	716,311	42
2	Alabama	Joseph M. Farley Nuclear Plant	15,104	50	316,989	56
3	Arizona	Palo Verde Nuclear Generating Station	1,365	65	1,295,802	27
4	Arkansas	Arkansas Nuclear One	32,038	33	154,290	63
5	California	Diablo Canyon Nuclear Power Plant	39,157	25	361,432	55
6	California	San Onofre Nuclear Generating Station	80,106	12	5,077,091	3
7	Connecticut	Millstone Power Station	118,811	6	1,522,087	21
8	Florida	Crystal River Nuclear Generating Plant	16,682	46	543,516	49
9	Florida	St. Lucie Plant	132,150	4	732,319	40
10	Florida	Turkey Point Nuclear Generating	89,348	11	2,489,137	12
11	Georgia	Edwin I. Hatch Nuclear Plant	9,459	59	243,782	58
12	Georgia	Vogtle Electric Generating Plant	6,629	62	517,981	51
13	Illinois	Braidwood Station	28,159	39	2,367,196	13
14	Illinois	Byron Station	19,736	44	706,621	43
15	Illinois	Clinton Power Station	13,021	55	548,176	48
16	Illinois	Dresden Nuclear Power Station	44,647	24	3,901,073	7
17	Illinois	LaSalle County Station	10,831	57	683,266	44
18	Illinois	Quad Cities Nuclear Power Station	33,742	31	539,561	50
19	Iowa	Duane Arnold Energy Center	77,265	14	462,956	52
20	Kansas	Wolf Creek Generating Station	8,404	60	133,789	64
21	Louisiana	River Bend Station	16,273	48	656,582	45
22	Louisiana	Waterford Steam Electric Station	61,978	17	1,655,821	17
23	Maryland	Calvert Cliffs Nuclear Power Plant	33,438	32	1,460,569	23
24	Massachusetts	Pilgrim Nuclear Power Station	59,169	19	2,907,647	10
25	Michigan	Donald C. Cook Nuclear Power Plant	51,729	21	809,517	34
26	Michigan	Fermi	78,888	13	4,489,966	4
27	Michigan	Palisades Nuclear Plant	34,133	30	794,744	35
28	Minnesota	Monticello Nuclear Generating Plant	28,856	38	1,544,634	19
29	Minnesota	Prairie Island Nuclear Generating Plant	22,549	42	1,465,322	22
30	Mississippi	Grand Gulf Nuclear Station	13,756	53	214,616	61
31	Missouri	Callaway Plant	8,124	61	307,345	57
32	Nebraska	Cooper Nuclear Station	11,078	56	117,399	65
33	Nebraska	Fort Calhoun Station	15,687	49	731,120	41
34	New Hampshire	Seabrook Station	101,342	8	3,465,615	9
35	New Jersey	Hope Creek Generating Station	34,738	28	4,052,631	5
36	New Jersey	Oyster Creek Nuclear Generating Station	91,665	10	2,132,640	14
37	New Jersey	Salem Nuclear Generating Station	34,738	29	4,011,786	6
38	New York	Indian Point Nuclear Generating	229,882	1	13,786,298	1
39	New York	James A. FitzPatrick Nuclear Power Plant	30,260	36	757,206	36
40	New York	Nine Mile Point Nuclear Station	30,260	37	754,261	37
41	New York	R.E. Ginna Nuclear Power Plant	49,871	23	987,092	30
42	North Carolina	Brunswick Steam Electric Plant	13,649	54	232,337	60
43	North Carolina	McGuire Nuclear Station	61,535	18	1,636,412	18
44	North Carolina	Shearon Harris Nuclear Power Plant	24,724	40	1,393,352	25
45	Ohio	Davis-Besse Nuclear Power Station	22,999	41	1,343,578	26
46	Ohio	Perry Nuclear Power Plant	68,920	16	1,766,037	15
47	Pennsylvania	Beaver Valley Power Station	119,111	5	2,824,537	11
48	Pennsylvania	Limerick Generating Station	184,712	2	5,986,390	2
49	Pennsylvania	Peach Bottom Atomic Power Station	35,760	27	3,569,625	8
50	Pennsylvania	Susquehanna Steam Electric Station	51,798	20	1,102,337	28
51	Pennsylvania	Three Mile Island Nuclear Station	156,537	3	1,718,797	16
52	South Carolina	Catawba Nuclear Station	101,221	9	1,437,561	24
53	South Carolina	H. B. Robinson Steam Electric Plant	30,342	35	568,041	47
54	South Carolina	Oconee Nuclear Station	51,644	22	873,312	33
55	South Carolina	Virgil C. Summer Nuclear Station	14,256	52	749,396	38
56	Tennessee	Sequoyah Nuclear Plant	76,278	15	747,693	39
57	Tennessee	Watts Bar Nuclear Plant	17,803	45	616,648	46
58	Texas	Comanche Peak Steam Electric Station	16,383	47	881,604	32
59	Texas	South Texas Project	3,233	64	199,113	62
60	Vermont	Vermont Yankee Nuclear Power Plant	31,215	34	893,297	31
61	Virginia	North Anna Power Station	14,747	51	1,085,119	29
62	Virginia	Surry Nuclear Power Station	108,530	7	1,523,998	20
63	Washington	Columbia Generating Station	3,530	63	234,431	59
64	Wisconsin	Kewaunee Power Station	10,660	58	420,870	53
65	Wisconsin	Point Beach Nuclear Plant	20,905	43	418,292	54
		Total population living nearby areas	3,000,656		82,074,637	
		Total population living outside areas	245,708,702		166,634,721	
		Total population in US	248,709,358		248,709,358	

Table A.8

A Summary of Results for Two Independent-sample T-tests (Welch's T-test) Calculated to Identify Differences in the Demographic Composition of Populations Living within a 50-mile Radius of and in the Outlying Areas surrounding a U.S.-based NPP as of 2000

			2000						
Index	State	Plant	White %	Black %	Asian %	Native %	Others %	Hispanic %	Color %
1	Alabama	Browns Ferry Nuclear Plant							
2	Alabama	Joseph M. Farley Nuclear Plant							
3	Arizona	Palo Verde Nuclear Generating Station							
4	Arkansas	Arkansas Nuclear One							
5	California	Diablo Canyon Nuclear Power Plant							
6	California	San Onofre Nuclear Generating Station							
7	Connecticut	Millstone Power Station							
8	Florida	Crystal River Nuclear Generating Plant							
9	Florida	St. Lucie Plant							
10	Florida	Turkey Point Nuclear Generating							
11	Georgia	Edwin I. Hatch Nuclear Plant							
12	Georgia	Vogtle Electric Generating Plant							
13	Illinois	Braidwood Station							
14	Illinois	Byron Station							
15	Illinois	Clinton Power Station							
16	Illinois	Dresden Nuclear Power Station							
17	Illinois	LaSalle County Station							
18	Illinois	Quad Cities Nuclear Power Station							
19	Iowa	Duane Arnold Energy Center							
20	Kansas	Wolf Creek Generating Station							
21	Louisiana	River Bend Station							
22	Louisiana	Waterford Steam Electric Station							
23	Maryland	Calvert Cliffs Nuclear Power Plant							
24	Massachusetts	Pilgrim Nuclear Power Station							
25	Michigan	Donald C. Cook Nuclear Power Plant							
26	Michigan	Fermi							
27	Michigan	Palisades Nuclear Plant							
28	Minnesota	Monticello Nuclear Generating Plant							
29	Minnesota	Prairie Island Nuclear Generating Plant							
30	Mississippi	Grand Gulf Nuclear Station							
31	Missouri	Callaway Plant							
32	Nebraska	Cooper Nuclear Station							
33	Nebraska	Fort Calhoun Station							
34	New Hampshire	Seabrook Station							
35	New Jersey	Hope Creek Generating Station							
36	New Jersey	Oyster Creek Nuclear Generating Station							
37	New Jersey	Salem Nuclear Generating Station							
38	New York	Indian Point Nuclear Generating							
39	New York	James A. FitzPatrick Nuclear Power Plant							
40	New York	Nine Mile Point Nuclear Station							
41	New York	R.E. Ginna Nuclear Power Plant							
42	North Carolina	Brunswick Steam Electric Plant							
43	North Carolina	McGuire Nuclear Station							
44	North Carolina	Shearon Harris Nuclear Power Plant							
45	Ohio	Davis-Besse Nuclear Power Station							
46	Ohio	Perry Nuclear Power Plant							
47	Pennsylvania	Beaver Valley Power Station							
48	Pennsylvania	Limerick Generating Station							
49	Pennsylvania	Peach Bottom Atomic Power Station							
50	Pennsylvania	Susquehanna Steam Electric Station							
51	Pennsylvania	Three Mile Island Nuclear Station							
52	South Carolina	Catawba Nuclear Station							
53	South Carolina	H. B. Robinson Steam Electric Plant							
54	South Carolina	Oconee Nuclear Station							
55	South Carolina	Virgil C. Summer Nuclear Station							
56	Tennessee	Sequoyah Nuclear Plant							
57	Tennessee	Watts Bar Nuclear Plant							
58	Texas	Comanche Peak Steam Electric Station							
59	Texas	South Texas Project							
60	Vermont	Vermont Yankee Nuclear Power Plant							
61	Virginia	North Anna Power Station							
62	Virginia	Surry Nuclear Power Station							
63	Washington	Columbia Generating Station							
64	Wisconsin	Kewaunee Power Station							
65	Wisconsin	Point Beach Nuclear Plant							
		Total	54	51	46	36	44	49	58
		Percent Total	83%	78%	71%	55%	68%	75%	89%

Note: Red flag represents statistical significance; green flag represents otherwise

Table A.9

A Summary of the Differences in Mean Demographic Composition of Populations Living within a 50-mile Radius of and in the Outlying Areas surrounding a U.S.-based NPP as of 2000

			2000						
Index	State	Plant	White %	Black %	Asian %	Native %	Others %	Hispanic %	Color %
1	Alabama	Browns Ferry Nuclear Plant	↑	↓	↓	↑	↑	↑	↓
2	Alabama	Joseph M. Farley Nuclear Plant	↓	↑	↓	↑	↓	↓	↑
3	Arizona	Palo Verde Nuclear Generating Station	↓	↑	↑	↑	↑	↑	↑
4	Arkansas	Arkansas Nuclear One	↑	↓	↓	↓	↑	↑	↓
5	California	Diablo Canyon Nuclear Power Plant	↑	↓	↓	↑	↓	↓	↓
6	California	San Onofre Nuclear Generating Station	↑	↓	↑	↓	↓	↓	↓
7	Connecticut	Millstone Power Station	↑	↓	↓	↓	↓	↓	↓
8	Florida	Crystal River Nuclear Generating Plant	↑	↓	↓	↑	↓	↓	↓
9	Florida	St. Lucie Plant	↑	↓	↓	↓	↓	↓	↓
10	Florida	Turkey Point Nuclear Generating	↓	↑	↑	↓	↑	↑	↑
11	Georgia	Edwin I. Hatch Nuclear Plant	↑	↓	↓	↓	↑	↑	↓
12	Georgia	Vogtle Electric Generating Plant	↑	↓	↓	↓	↑	↑	↓
13	Illinois	Braidwood Station	↑	↓	↓	↓	↓	↓	↓
14	Illinois	Byron Station	↑	↓	↓	↓	↓	↓	↓
15	Illinois	Clinton Power Station	↑	↓	↓	↓	↓	↓	↓
16	Illinois	Dresden Nuclear Power Station	↓	↑	↑	↓	↑	↑	↑
17	Illinois	LaSalle County Station	↑	↓	↓	↓	↓	↓	↓
18	Illinois	Quad Cities Nuclear Power Station	↑	↓	↓	↑	↓	↓	↓
19	Iowa	Duane Arnold Energy Center	↓	↑	↑	↓	↓	↓	↑
20	Kansas	Wolf Creek Generating Station	↑	↓	↓	↓	↓	↓	↓
21	Louisiana	River Bend Station	↓	↑	↑	↓	↓	↓	↑
22	Louisiana	Waterford Steam Electric Station	↓	↑	↑	↓	↑	↑	↑
23	Maryland	Calvert Cliffs Nuclear Power Plant	↓	↑	↓	↓	↓	↓	↑
24	Massachusetts	Pilgrim Nuclear Power Station	↓	↑	↑	↑	↑	↓	↑
25	Michigan	Donald C. Cook Nuclear Power Plant	↑	↓	↓	↓	↑	↑	↓
26	Michigan	Fermi	↓	↑	↑	↓	↑	↑	↑
27	Michigan	Palisades Nuclear Plant	↑	↓	↓	↓	↑	↑	↓
28	Minnesota	Monticello Nuclear Generating Plant	↓	↑	↑	↓	↑	↑	↑
29	Minnesota	Prairie Island Nuclear Generating Plant	↓	↑	↑	↓	↑	↑	↑
30	Mississippi	Grand Gulf Nuclear Station	↓	↑	↓	↓	↓	↓	↑
31	Missouri	Callaway Plant	↑	↓	↑	↓	↓	↓	↓
32	Nebraska	Cooper Nuclear Station	↑	↓	↓	↑	↓	↓	↓
33	Nebraska	Fort Calhoun Station	↓	↑	↑	↑	↑	↑	↑
34	New Hampshire	Seabrook Station	↓	↑	↑	↓	↑	↑	↑
35	New Jersey	Hope Creek Generating Station	↓	↑	↓	↑	↑	↓	↑
36	New Jersey	Oyster Creek Nuclear Generating Station	↑	↓	↓	↓	↓	↓	↓
37	New Jersey	Salem Nuclear Generating Station	↓	↑	↓	↑	↑	↓	↑
38	New York	Indian Point Nuclear Generating	↓	↑	↑	↓	↑	↑	↑
39	New York	James A. FitzPatrick Nuclear Power Plant	↑	↓	↓	↑	↓	↓	↓
40	New York	Nine Mile Point Nuclear Station	↑	↓	↓	↑	↓	↓	↓
41	New York	R.E. Ginna Nuclear Power Plant	↑	↓	↓	↓	↓	↓	↓
42	North Carolina	Brunswick Steam Electric Plant	↑	↓	↓	↑	↓	↓	↓
43	North Carolina	McGuire Nuclear Station	↑	↓	↑	↓	↑	↑	↓
44	North Carolina	Shearon Harris Nuclear Power Plant	↓	↑	↑	↓	↑	↑	↑
45	Ohio	Davis-Besse Nuclear Power Station	↑	↓	↓	↓	↑	↑	↓
46	Ohio	Perry Nuclear Power Plant	↓	↑	↓	↓	↑	↓	↑
47	Pennsylvania	Beaver Valley Power Station	↑	↑	↓	↓	↓	↓	↓
48	Pennsylvania	Limerick Generating Station	↓	↑	↓	↑	↓	↓	↑
49	Pennsylvania	Peach Bottom Atomic Power Station	↓	↑	↓	↑	↑	↑	↑
50	Pennsylvania	Susquehanna Steam Electric Station	↑	↓	↓	↑	↓	↓	↓
51	Pennsylvania	Three Mile Island Nuclear Station	↑	↓	↓	↓	↓	↑	↓
52	South Carolina	Catawba Nuclear Station	↑	↓	↑	↓	↑	↑	↓
53	South Carolina	H. B. Robinson Steam Electric Plant	↓	↑	↓	↓	↓	↓	↑
54	South Carolina	Oconee Nuclear Station	↑	↓	↓	↓	↓	↓	↓
55	South Carolina	Virgil C. Summer Nuclear Station	↓	↑	↑	↓	↓	↓	↑
56	Tennessee	Sequoyah Nuclear Plant	↑	↓	↓	↓	↑	↑	↓
57	Tennessee	Watts Bar Nuclear Plant	↑	↓	↓	↑	↓	↓	↓
58	Texas	Comanche Peak Steam Electric Station	↑	↑	↓	↑	↓	↓	↓
59	Texas	South Texas Project	↑	↓	↓	↓	↑	↓	↓
60	Vermont	Vermont Yankee Nuclear Power Plant	↑	↓	↓	↓	↑	↑	↓
61	Virginia	North Anna Power Station	↑	↑	↓	↑	↓	↓	↓
62	Virginia	Surry Nuclear Power Station	↓	↑	↓	↓	↓	↓	↑
63	Washington	Columbia Generating Station	↓	↓	↓	↓	↑	↑	↑
64	Wisconsin	Kewaunee Power Station	↑	↓	↑	↑	↓	↓	↓
65	Wisconsin	Point Beach Nuclear Plant	↑	↓	↑	↑	↓	↓	↓
		Total	39	28	21	22	29	25	26
		Percent Total	60%	43%	32%	34%	45%	38%	40%

Note: Green Arrow represents demographic percent composition greater than in outlying areas; Red arrow represents otherwise

Table A.10

A Summary of Results for Two Independent-sample T-tests (Welch's T-test) Calculated to Identify Differences in Demographic Composition of Populations Living within a 50-mile Radius of and in the Outlying Areas surrounding a U.S.-based NPP as of 1990

			1990						
Index	State	Plant	White %	Black %	Asian %	Native %	Others %	Hispanic %	Color %
1	Alabama	Browns Ferry Nuclear Plant							
2	Alabama	Joseph M. Farley Nuclear Plant							
3	Arizona	Palo Verde Nuclear Generating Station							
4	Arkansas	Arkansas Nuclear One							
5	California	Diablo Canyon Nuclear Power Plant							
6	California	San Onofre Nuclear Generating Station							
7	Connecticut	Millstone Power Station							
8	Florida	Crystal River Nuclear Generating Plant							
9	Florida	St. Lucie Plant							
10	Florida	Turkey Point Nuclear Generating							
11	Georgia	Edwin I. Hatch Nuclear Plant							
12	Georgia	Vogtle Electric Generating Plant							
13	Illinois	Braidwood Station							
14	Illinois	Byron Station							
15	Illinois	Clinton Power Station							
16	Illinois	Dresden Nuclear Power Station							
17	Illinois	LaSalle County Station							
18	Illinois	Quad Cities Nuclear Power Station							
19	Iowa	Duane Arnold Energy Center							
20	Kansas	Wolf Creek Generating Station							
21	Louisiana	River Bend Station							
22	Louisiana	Waterford Steam Electric Station							
23	Maryland	Calvert Cliffs Nuclear Power Plant							
24	Massachusetts	Pilgrim Nuclear Power Station							
25	Michigan	Donald C. Cook Nuclear Power Plant							
26	Michigan	Fermi							
27	Michigan	Palisades Nuclear Plant							
28	Minnesota	Monticello Nuclear Generating Plant							
29	Minnesota	Prairie Island Nuclear Generating Plant							
30	Mississippi	Grand Gulf Nuclear Station							
31	Missouri	Callaway Plant							
32	Nebraska	Cooper Nuclear Station							
33	Nebraska	Fort Calhoun Station							
34	New Hampshire	Seabrook Station							
35	New Jersey	Hope Creek Generating Station							
36	New Jersey	Oyster Creek Nuclear Generating Station							
37	New Jersey	Salem Nuclear Generating Station							
38	New York	Indian Point Nuclear Generating							
39	New York	James A. FitzPatrick Nuclear Power Plant							
40	New York	Nine Mile Point Nuclear Station							
41	New York	R.E. Ginna Nuclear Power Plant							
42	North Carolina	Brunswick Steam Electric Plant							
43	North Carolina	McGuire Nuclear Station							
44	North Carolina	Shearon Harris Nuclear Power Plant							
45	Ohio	Davis-Besse Nuclear Power Station							
46	Ohio	Perry Nuclear Power Plant							
47	Pennsylvania	Beaver Valley Power Station							
48	Pennsylvania	Limerick Generating Station							
49	Pennsylvania	Peach Bottom Atomic Power Station							
50	Pennsylvania	Susquehanna Steam Electric Station							
51	Pennsylvania	Three Mile Island Nuclear Station							
52	South Carolina	Catawba Nuclear Station							
53	South Carolina	H. B. Robinson Steam Electric Plant							
54	South Carolina	Oconee Nuclear Station							
55	South Carolina	Virgil C. Summer Nuclear Station							
56	Tennessee	Sequoyah Nuclear Plant							
57	Tennessee	Watts Bar Nuclear Plant							
58	Texas	Comanche Peak Steam Electric Station							
59	Texas	South Texas Project							
60	Vermont	Vermont Yankee Nuclear Power Plant							
61	Virginia	North Anna Power Station							
62	Virginia	Surry Nuclear Power Station							
63	Washington	Columbia Generating Station							
64	Wisconsin	Kewaunee Power Station							
65	Wisconsin	Point Beach Nuclear Plant							
		Total	48	49	45	41	46	47	52
		Percent Total	74%	75%	69%	63%	71%	72%	80%

Note: Red flag represents statistical significance; green flag signals represents otherwise

Table A.11

A Summary of the Differences in the Mean Demographic Composition of Populations Living within a 50-mile Radius of and in the Outlying Areas surrounding a U.S.-based NPP as of 1990

			1990						
Index	State	Plant	White %	Black %	Asian %	Native %	Others %	Hispanic %	Color %
1	Alabama	Browns Ferry Nuclear Plant	↑	↓	↑	↑	↓	↓	↓
2	Alabama	Joseph M. Farley Nuclear Plant	↓	↑	↓	↑	↓	↓	↑
3	Arizona	Palo Verde Nuclear Generating Station	↑	↑	↑	↑	↑	↑	↑
4	Arkansas	Arkansas Nuclear One	↑	↓	↓	↓	↓	↓	↓
5	California	Diablo Canyon Nuclear Power Plant	↑	↓	↑	↓	↓	↓	↓
6	California	San Onofre Nuclear Generating Station	↑	↓	↓	↓	↓	↓	↓
7	Connecticut	Millstone Power Station	↑	↓	↓	↓	↓	↓	↓
8	Florida	Crystal River Nuclear Generating Plant	↑	↓	↓	↑	↓	↓	↓
9	Florida	St. Lucie Plant	↑	↓	↓	↓	↓	↓	↓
10	Florida	Turkey Point Nuclear Generating	↓	↑	↑	↓	↑	↑	↑
11	Georgia	Edwin I. Hatch Nuclear Plant	↑	↓	↓	↓	↑	↑	↓
12	Georgia	Vogtle Electric Generating Plant	↑	↓	↓	↓	↑	↑	↓
13	Illinois	Braidwood Station	↑	↓	↓	↓	↓	↓	↓
14	Illinois	Byron Station	↑	↓	↓	↓	↓	↓	↓
15	Illinois	Clinton Power Station	↑	↓	↓	↓	↓	↓	↓
16	Illinois	Dresden Nuclear Power Station	↑	↓	↓	↓	↓	↓	↓
17	Illinois	LaSalle County Station	↑	↓	↓	↓	↓	↓	↓
18	Illinois	Quad Cities Nuclear Power Station	↑	↓	↓	↑	↓	↓	↓
19	Iowa	Duane Arnold Energy Center	↓	↑	↑	↓	↓	↓	↑
20	Kansas	Wolf Creek Generating Station	↑	↓	↓	↓	↓	↓	↓
21	Louisiana	River Bend Station	↑	↓	↑	↓	↓	↓	↓
22	Louisiana	Waterford Steam Electric Station	↓	↑	↑	↓	↑	↑	↑
23	Maryland	Calvert Cliffs Nuclear Power Plant	↓	↑	↓	↑	↓	↓	↑
24	Massachusetts	Pilgrim Nuclear Power Station	↓	↑	↑	↓	↑	↓	↑
25	Michigan	Donald C. Cook Nuclear Power Plant	↑	↓	↓	↓	↑	↑	↓
26	Michigan	Fermi	↓	↑	↑	↓	↑	↑	↑
27	Michigan	Palisades Nuclear Plant	↑	↓	↑	↓	↑	↑	↓
28	Minnesota	Monticello Nuclear Generating Plant	↓	↑	↑	↓	↓	↓	↑
29	Minnesota	Prairie Island Nuclear Generating Plant	↓	↑	↑	↓	↓	↑	↑
30	Mississippi	Grand Gulf Nuclear Station	↓	↑	↓	↓	↓	↓	↓
31	Missouri	Callaway Plant	↑	↓	↑	↓	↓	↓	↓
32	Nebraska	Cooper Nuclear Station	↑	↓	↓	↑	↓	↓	↓
33	Nebraska	Fort Calhoun Station	↓	↑	↑	↑	↑	↑	↑
34	New Hampshire	Seabrook Station	↓	↑	↑	↓	↑	↑	↑
35	New Jersey	Hope Creek Generating Station	↓	↑	↓	↑	↑	↓	↑
36	New Jersey	Oyster Creek Nuclear Generating Station	↑	↓	↓	↓	↓	↓	↓
37	New Jersey	Salem Nuclear Generating Station	↓	↑	↓	↑	↑	↓	↑
38	New York	Indian Point Nuclear Generating	↓	↑	↑	↓	↑	↑	↑
39	New York	James A. FitzPatrick Nuclear Power Plant	↑	↓	↓	↑	↓	↓	↓
40	New York	Nine Mile Point Nuclear Station	↑	↓	↓	↑	↓	↓	↓
41	New York	R.E. Ginna Nuclear Power Plant	↑	↓	↓	↓	↓	↓	↓
42	North Carolina	Brunswick Steam Electric Plant	↑	↓	↓	↑	↓	↓	↓
43	North Carolina	McGuire Nuclear Station	↑	↓	↑	↓	↑	↑	↑
44	North Carolina	Shearon Harris Nuclear Power Plant	↓	↑	↑	↓	↓	↓	↓
45	Ohio	Davis-Besse Nuclear Power Station	↑	↓	↓	↓	↑	↑	↓
46	Ohio	Perry Nuclear Power Plant	↓	↑	↑	↑	↑	↑	↑
47	Pennsylvania	Beaver Valley Power Station	↑	↑	↓	↓	↓	↓	↓
48	Pennsylvania	Limerick Generating Station	↓	↑	↓	↓	↓	↓	↓
49	Pennsylvania	Peach Bottom Atomic Power Station	↓	↑	↓	↑	↑	↑	↑
50	Pennsylvania	Susquehanna Steam Electric Station	↑	↓	↓	↓	↓	↓	↓
51	Pennsylvania	Three Mile Island Nuclear Station	↑	↓	↓	↓	↑	↓	↓
52	South Carolina	Catawba Nuclear Station	↑	↓	↑	↓	↓	↓	↑
53	South Carolina	H. B. Robinson Steam Electric Plant	↓	↑	↓	↓	↓	↓	↓
54	South Carolina	Oconee Nuclear Station	↑	↓	↓	↓	↓	↓	↓
55	South Carolina	Virgil C. Summer Nuclear Station	↓	↑	↑	↓	↑	↑	↑
56	Tennessee	Sequoyah Nuclear Plant	↑	↓	↓	↑	↓	↓	↓
57	Tennessee	Watts Bar Nuclear Plant	↑	↓	↓	↑	↓	↓	↓
58	Texas	Comanche Peak Steam Electric Station	↑	↑	↓	↑	↓	↓	↓
59	Texas	South Texas Project	↑	↑	↓	↓	↑	↓	↓
60	Vermont	Vermont Yankee Nuclear Power Plant	↓	↓	↓	↓	↑	↑	↓
61	Virginia	North Anna Power Station	↑	↑	↓	↑	↓	↓	↓
62	Virginia	Surry Nuclear Power Station	↓	↑	↑	↓	↑	↑	↑
63	Washington	Columbia Generating Station	↓	↓	↓	↑	↑	↑	↑
64	Wisconsin	Kewaunee Power Station	↑	↓	↑	↑	↓	↓	↓
65	Wisconsin	Point Beach Nuclear Plant	↑	↓	↓	↑	↓	↓	↓
		Total	41	27	24	22	24	20	22
		Percent Total	63%	42%	37%	34%	37%	31%	34%

Note: Green Arrow represents demographic percent composition greater than in outlying areas; Red arrow represents otherwise

APPENDIX B

DESCRIPTIVE ANALYSES AND SIGNIFICANT T-TESTS

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1. Browns Ferry Nuclear Plant, Alabama

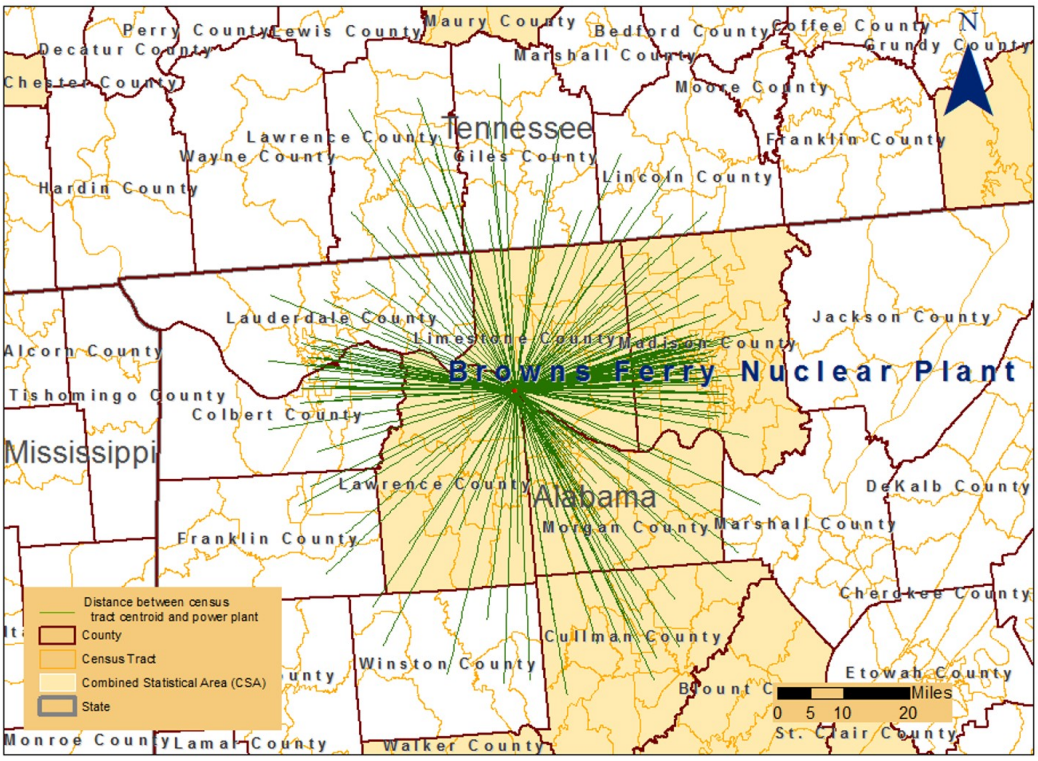

Figure B. 1 Distance to census-tract center points of census tracts within a 50-mile radius of Browns Ferry Nuclear Plant in Alabama

Table B. 1

Demographic Composition of Population, as sorted by Distance from Browns Ferry Nuclear Plant, Alabama in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	10	35	71	64	27	207	2,471
Tract area (sq. mile)	302	964	1,607	1,877	1,603	6,353	88,211
Total population	36,259	118,087	240,080	219,938	101,947	716,311	8,201,456
White	24,454	105,244	186,051	200,891	97,148	613,788	6,409,774
Black	11,481	10,323	49,527	15,824	4,342	91,497	1,705,299
Asian	92	545	2,328	2,038	181	5,184	47,166
Native American	194	1,856	1,640	945	247	4,882	25,891
Others	38	115	544	243	27	967	13,340
Hispanic	119	686	2,090	1,285	343	4,523	50,135
Color	11,881	13,371	55,147	20,054	5,094	105,547	1,824,165
White (%)	67.44	89.12	77.50	91.34	95.29	85.69	78.15
Black (%)	31.66	8.74	20.63	7.19	4.26	12.77	20.79
Asian (%)	0.25	0.46	0.97	0.93	0.18	0.72	0.58
Native American (%)	0.54	1.57	0.68	0.43	0.24	0.68	0.32
Others (%)	0.10	0.10	0.23	0.11	0.03	0.13	0.16
Hispanic (%)	0.33	0.58	0.87	0.58	0.34	0.63	0.61
Color (%)	32.77	11.32	22.97	9.12	5.00	14.73	22.24
Female (%)	51.78	50.77	50.89	51.75	51.60	51.28	52.03
Elderly (65 + years) (%)	13.05	10.88	10.26	13.07	14.78	12.01	12.86
Kid (< 5 years) (%)	8.92	8.28	8.38	8.01	8.43	8.28	8.29
Native-born (%)	99.70	99.07	97.86	98.52	99.64	98.61	98.87
Renter housing units (%)	26.48	25.52	32.30	22.05	23.74	26.52	28.20
Education (%)	12.45	16.74	20.59	21.38	7.96	18.00	15.64
Unemployment (%)	7.55	5.46	5.96	5.12	6.59	5.78	6.69
Poverty (%)	17.47	12.53	13.71	11.72	17.50	13.63	17.19
Mean household income ($)	49,881	56,000	54,512	59,278	42,778	54,307	51,020
Year 2000							
Total population	38,640	143,349	263,503	251,145	116,327	812,964	9,323,419
White	25,495	120,917	189,607	223,740	109,114	668,873	7,055,252
Black	11,681	15,402	61,373	18,372	4,733	111,561	1,971,347
Asian	113	1,261	2,976	2,145	328	6,823	80,563
Native American	329	1,829	2,334	1,403	399	6,294	32,144
Others	1,022	3,930	7,221	5,495	1,743	19,411	184,115
Hispanic	1,283	3,916	4,416	5,369	1,919	16,903	175,149
Color	13,776	24,724	75,857	30,103	8,107	152,567	2,348,154
White (%)	65.98	84.35	71.96	89.09	93.80	82.28	75.67
Black (%)	30.23	10.74	23.29	7.32	4.07	13.72	21.14
Asian (%)	0.29	0.88	1.13	0.85	0.28	0.84	0.86
Native American (%)	0.85	1.28	0.89	0.56	0.34	0.77	0.34
Others (%)	2.64	2.74	2.74	2.19	1.50	2.39	1.97
Hispanic (%)	3.32	2.73	1.68	2.14	1.65	2.08	1.88
Color (%)	35.65	17.25	28.79	11.99	6.97	18.77	25.19
Female (%)	51.16	50.27	51.29	51.53	51.30	51.18	51.57
Elderly (65 + years) (%)	12.31	11.26	11.46	14.28	14.82	12.82	12.64
Kid (< 5 years) (%)	7.88	8.20	7.97	7.46	7.62	7.80	7.95
Native-born (%)	97.88	97.37	97.04	97.44	98.61	97.49	97.57
Renter housing units (%)	24.97	22.96	29.04	20.19	21.63	23.98	26.30
College degree or higher (%)	14.80	21.21	23.36	24.83	10.97	21.26	19.16
Unemployment (%)	5.97	4.90	6.83	4.00	5.87	5.45	5.81
Poverty (%)	18.08	11.60	12.97	11.12	15.11	12.70	14.80
Mean household income ($)	55,722	62,486	59,569	65,931	51,161	60,667	59,018
Year 2010							
Total population	40,292	164,818	294,974	268,473	116,817	885,374	10,062,245
White	27,807	133,604	206,691	235,486	109,217	712,805	7,491,857
Black	9,843	20,368	71,901	21,230	3,892	127,234	2,142,467
Asian	138	2,687	4,721	3,402	442	11,390	131,842
Native American	610	2,097	2,102	1,528	498	6,835	34,216
Others	1,894	6,062	9,559	6,827	2,768	27,110	261,863
Hispanic	3,196	9,223	11,974	8,942	3,608	36,943	386,876
Color	14,133	36,909	96,997	38,088	9,945	196,072	2,812,238
White (%)	69.01	81.06	70.07	87.71	93.49	80.51	74.46

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	24.43	12.36	24.38	7.91	3.33	14.37	21.29
Asian (%)	0.34	1.63	1.60	1.27	0.38	1.29	1.31
Native American (%)	1.51	1.27	0.71	0.57	0.43	0.77	0.34
Others (%)	4.70	3.68	3.24	2.54	2.37	3.06	2.60
Hispanic (%)	7.93	5.60	4.06	3.33	3.09	4.17	3.84
Color (%)	35.08	22.39	32.88	14.19	8.51	22.15	27.95
Female (%)	51.91	50.17	51.06	51.15	51.15	50.97	51.39
Elderly (65 + years) (%)	13.91	12.29	12.17	15.65	16.71	13.93	13.18
Kid (< 5 years) (%)	6.57	6.19	6.38	6.20	5.18	6.14	6.48
Native-born (%)	95.02	94.81	95.57	96.66	97.94	96.05	96.06
Renter housing units (%)	24.24	23.86	28.39	20.58	21.25	24.00	25.98
College degree or higher (%)	17.45	24.33	26.78	27.70	12.66	24.27	22.10
Unemployment (%)	12.09	7.17	9.30	6.77	8.43	8.15	8.69
Poverty (%)	17.70	12.49	14.94	13.88	17.47	14.62	16.95
Mean household income ($)	54,044	63,724	61,702	64,257	49,219	60,858	58,340
Index	1	1	1	1	1	1	1

Table B. 2

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Browns Ferry Nuclear Plant, Alabama

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	2678	1.70	2471	71.06	207	78.57	-7.515***	(-4.43)
Black	2678	1.63	2471	24.13	207	16.37	7.760***	(4.76)
Asian	2678	0.13	2471	1.22	207	1.17	0.0533	(0.40)
Native American	2678	0.10	2471	0.34	207	0.77	-0.433***	(-4.21)
Others	2678	0.23	2471	2.49	207	3.12	-0.633**	(-2.75)
Hispanic	2678	0.46	2471	3.59	207	4.25	-0.658	(-1.44)
Color	2678	1.77	2471	30.40	207	24.09	6.311***	(3.56)
White (2000)	2678	1.62	2471	74.34	207	80.59	-6.250***	(-3.86)
Black	2678	1.59	2471	22.41	207	15.40	7.008***	(4.42)
Asian	2678	0.09	2471	0.85	207	0.84	0.0118	(0.13)
Native American	2678	0.09	2471	0.34	207	0.80	-0.458***	(-4.91)
Others	2678	0.16	2471	1.95	207	2.37	-0.418**	(-2.66)
Hispanic	2678	0.21	2471	1.80	207	2.03	-0.228	(-1.11)
Color	2678	1.63	2471	26.35	207	20.44	5.910***	(3.63)
White (1990)	2678	1.43	2471	79.23	207	85.61	-6.382***	(-4.47)
Black	2678	1.43	2471	19.61	207	12.84	6.772***	(4.74)
Asian	2678	0.09	2471	0.57	207	0.74	-0.167	(-1.80)
Native American	2678	0.11	2471	0.31	207	0.69	-0.379***	(-3.50)
Others	2678	0.02	2471	0.16	207	0.12	0.0435	(1.74)
Hispanic	2678	0.06	2471	0.62	207	0.61	0.0137	(0.22)
Color	2678	1.43	2471	21.06	207	14.81	6.253***	(4.38)

*p<0.05, **p<0.01, ***p<0.001

2. Joseph M. Farley Nuclear Plant, Alabama

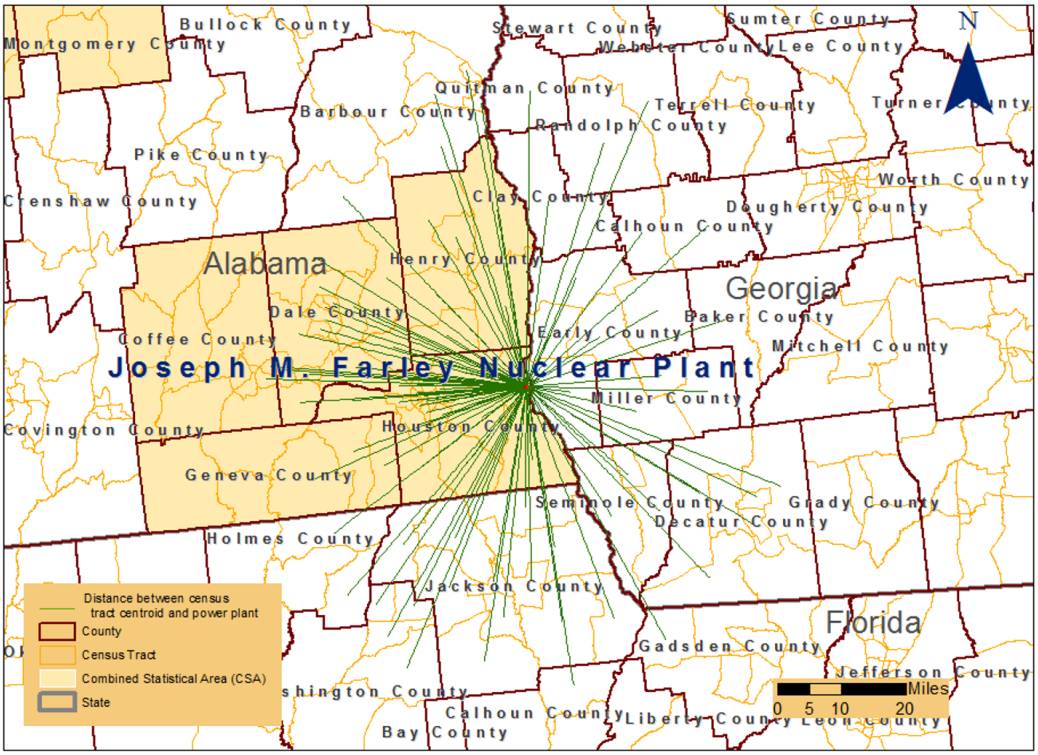

Figure B. 2 Distance to census-tract center points of census tracts within a 50-mile radius of Joseph M. Farley Nuclear Plant in Alabama

Table B. 3

Demographic Composition of Population, as sorted by Distance from Joseph M. Farley Nuclear Plant, Alabama in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	5	22	21	28	18	94	7,301
Tract area (sq. mile)	358	885	1,745	2,026	1,629	6,642	170,960
Total population	15,104	76,597	60,730	101,613	62,945	316,989	23,139,704
White	11,933	53,836	44,653	72,411	43,971	226,804	18,107,526
Black	3,096	22,242	15,579	27,185	18,101	86,203	4,434,358
Asian	2	317	154	898	325	1,696	244,015
Native American	62	157	239	534	335	1,327	74,867
Others	12	44	106	583	218	963	278,930
Hispanic	57	373	1,336	1,796	791	4,353	1,675,669
Color	3,212	22,963	17,149	30,155	19,461	92,940	6,365,508
White (%)	79.01	70.28	73.53	71.26	69.86	71.55	78.25
Black (%)	20.50	29.04	25.65	26.75	28.76	27.19	19.16
Asian (%)	0.01	0.41	0.25	0.88	0.52	0.54	1.05
Native American (%)	0.41	0.20	0.39	0.53	0.53	0.42	0.32
Others (%)	0.08	0.06	0.17	0.57	0.35	0.30	1.21
Hispanic (%)	0.38	0.49	2.20	1.77	1.26	1.37	7.24
Color (%)	21.27	29.98	28.24	29.68	30.92	29.32	27.51
Female (%)	51.60	52.97	51.31	50.38	52.70	51.70	51.69
Elderly (65 + years) (%)	14.04	13.41	14.09	12.41	14.17	13.40	15.13
Kid (< 5 years) (%)	8.58	8.68	8.11	9.16	7.89	8.56	8.28
Native-born (%)	99.69	99.32	97.58	98.05	98.38	98.41	91.90
Renter housing units (%)	19.63	31.89	18.76	28.94	26.46	26.73	28.42
Education (%)	6.81	15.19	8.88	12.05	11.78	11.87	18.20
Unemployment (%)	4.75	5.21	5.29	6.20	6.29	5.70	5.95
Poverty (%)	18.22	19.50	20.77	19.73	22.73	20.38	14.12
Mean household income ($)	43,205	50,080	44,969	42,653	41,130	44,687	58,591
Year 2000							
Total population	15,882	80,324	70,181	107,605	69,667	343,659	28,272,272
White	12,428	52,701	50,919	73,826	45,531	235,405	20,716,744
Black	3,283	25,867	17,510	29,538	21,878	98,076	5,709,183
Asian	20	383	261	737	437	1,838	475,775
Native American	32	361	246	612	284	1,535	99,478
Others	120	1,011	1,248	2,887	1,552	6,818	1,271,080
Hispanic	151	921	1,342	2,810	1,944	7,168	3,175,749
Color	3,516	28,030	19,912	34,956	25,075	111,489	9,791,218
White (%)	78.25	65.61	72.55	68.61	65.36	68.50	73.28
Black (%)	20.67	32.20	24.95	27.45	31.40	28.54	20.19
Asian (%)	0.13	0.48	0.37	0.68	0.63	0.53	1.68
Native American (%)	0.20	0.45	0.35	0.57	0.41	0.45	0.35
Others (%)	0.76	1.26	1.78	2.68	2.23	1.98	4.50
Hispanic (%)	0.95	1.15	1.91	2.61	2.79	2.09	11.23
Color (%)	22.14	34.90	28.37	32.49	35.99	32.44	34.63
Female (%)	52.49	51.75	50.75	50.47	50.25	50.87	51.24
Elderly (65 + years) (%)	14.14	14.27	14.57	13.19	14.48	14.03	14.59
Kid (< 5 years) (%)	7.85	8.08	7.51	8.38	7.78	7.99	7.69
Native-born (%)	99.07	98.52	98.95	97.64	97.56	98.16	88.22
Renter housing units (%)	16.05	29.76	17.23	25.65	25.99	24.45	26.74
College degree or higher (%)	10.45	17.31	13.21	12.86	13.36	13.97	22.47
Unemployment (%)	4.88	6.09	4.94	7.31	5.92	6.11	5.63
Poverty (%)	15.64	17.81	16.32	19.38	20.57	18.43	13.14
Mean household income ($)	51,195	53,088	54,466	46,642	48,381	50,377	66,419
Year 2010							
Total population	17,021	84,626	77,175	108,538	72,992	360,352	32,332,734
White	12,261	53,343	57,249	72,860	48,375	244,088	22,953,312
Black	4,218	28,075	17,356	31,014	21,146	101,809	6,903,997
Asian	47	654	621	827	698	2,847	807,358
Native American	119	301	178	403	435	1,436	102,182
Others	376	2,253	1,771	3,434	2,338	10,172	1,565,885
Hispanic	376	2,209	1,850	5,110	3,115	12,660	4,929,747
Color	4,982	32,178	21,139	38,629	26,626	123,554	13,066,692
White (%)	72.03	63.03	74.18	67.13	66.27	67.74	70.99

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	24.78	33.18	22.49	28.57	28.97	28.25	21.35
Asian (%)	0.28	0.77	0.80	0.76	0.96	0.79	2.50
Native American (%)	0.70	0.36	0.23	0.37	0.60	0.40	0.32
Others (%)	2.21	2.66	2.29	3.16	3.20	2.82	4.84
Hispanic (%)	2.21	2.61	2.40	4.71	4.27	3.51	15.25
Color (%)	29.27	38.02	27.39	35.59	36.48	34.29	40.41
Female (%)	52.69	51.25	50.64	48.80	49.71	50.14	51.18
Elderly (65 + years) (%)	15.64	13.79	15.44	14.36	15.31	14.71	14.50
Kid (< 5 years) (%)	4.97	7.14	5.99	6.53	6.38	6.46	6.34
Native-born (%)	98.32	97.80	97.49	97.17	96.11	97.23	85.75
Renter housing units (%)	18.65	30.07	18.34	27.80	26.48	25.58	25.47
College degree or higher (%)	12.53	17.62	14.57	13.74	15.20	15.05	25.79
Unemployment (%)	6.11	7.71	8.34	7.78	9.55	8.14	8.85
Poverty (%)	15.77	20.05	17.96	18.53	21.44	19.21	14.79
Mean household income ($)	48,218	51,861	55,221	47,416	47,774	50,227	65,299
Index	2	2	2	2	2	2	2

Table B. 4

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Joseph M. Farley Nuclear Plant in Alabama

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	7395	2.09	7301	70.00	94	65.97	4.035	(1.93)
Black	7395	2.11	7301	21.80	94	30.49	-8.700***	(-4.13)
Asian	7395	0.13	7301	2.20	94	0.68	1.519***	(11.78)
Native American	7395	0.06	7301	0.32	94	0.37	-0.049	(-0.79)
Others	7395	0.21	7301	4.41	94	2.48	1.921***	(9.16)
Hispanic	7395	0.42	7301	13.76	94	3.00	10.76***	(25.75)
Color	7395	2.09	7301	39.03	94	35.76	3.264	(1.56)
White (2000)	7395	2.07	7301	73.88	94	67.33	6.552**	(3.17)
Black	7395	2.11	7301	19.92	94	29.88	-9.960***	(-4.72)
Asian	7395	0.08	7301	1.57	94	0.46	1.115***	(13.99)
Native American	7395	0.05	7301	0.35	94	0.45	-0.0938	(-1.71)
Others	7395	0.18	7301	4.21	94	1.89	2.320***	(12.77)
Hispanic	7395	0.28	7301	10.21	94	1.91	8.298***	(29.76)
Color	7395	2.07	7301	33.14	94	33.48	-0.346	(-0.17)
White (1990)	7395	2.08	7301	80.27	94	71.14	9.131***	(4.38)
Black	7395	2.12	7301	17.01	94	27.75	-10.75***	(-5.06)
Asian	7395	0.08	7301	1.02	94	0.45	0.570***	(6.76)
Native American	7395	0.05	7301	0.34	94	0.41	-0.0751	(-1.53)
Others	7395	0.07	7301	1.14	94	0.25	0.891***	(12.79)
Hispanic	7395	0.30	7301	6.58	94	1.17	5.404***	(18.26)
Color	7395	2.09	7301	24.64	94	29.60	-4.958*	(-2.38)

*p<0.05, **p<0.01, ***p<0.001

3. Palo Verde Nuclear Generating Station, Arizona

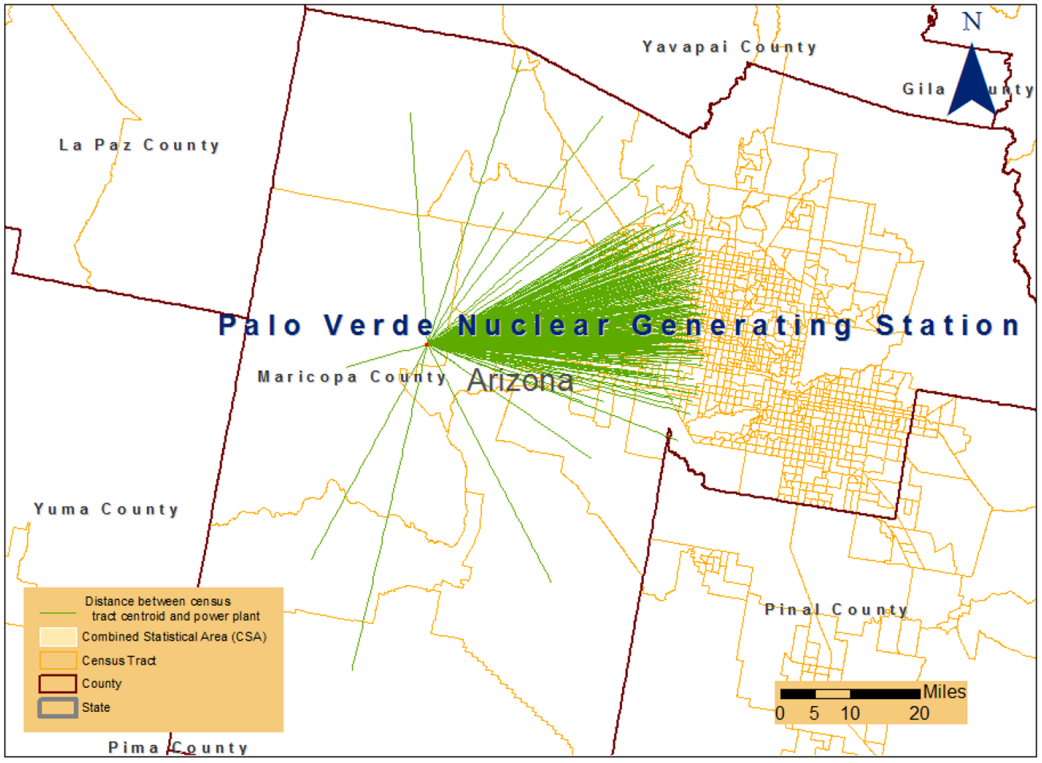

Figure B. 3 Distance to census-tract center points of census tracts within a 50-mile radius of Palo Verde Nuclear Generating Station, Arizona in 1990, 2000, and 2010

Table B. 5

Demographic Composition of Population, as sorted by Distance from Palo Verde Nuclear Generating Station, Arizona in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	1	8	39	192	294	534	992
Tract area (sq. mile)	120	1,658	672	2,661	1,831	6,942	107,049
Total population	1,365	10,128	38,556	379,343	866,410	1,295,802	2,369,419
White	1,090	8,112	28,273	299,286	714,771	1,051,532	1,916,149
Black	0	328	2,073	15,153	42,671	60,225	49,833
Asian	0	44	563	5,254	14,728	20,589	33,539
Native American	72	209	496	6,985	18,992	26,754	177,831
Others	203	1,440	7,144	52,651	75,260	136,698	192,071
Hispanic	203	2,580	11,418	85,971	162,063	262,235	418,401
Color	275	3,137	14,272	112,206	234,538	364,428	668,883
White (%)	79.85	80.09	73.33	78.90	82.50	81.15	80.87
Black (%)	0.00	3.24	5.38	3.99	4.93	4.65	2.10
Asian (%)	0.00	0.43	1.46	1.39	1.70	1.59	1.42
Native American (%)	5.27	2.06	1.29	1.84	2.19	2.06	7.51
Others (%)	14.87	14.22	18.53	13.88	8.69	10.55	8.11
Hispanic (%)	14.87	25.47	29.61	22.66	18.71	20.24	17.66
Color (%)	20.15	30.97	37.02	29.58	27.07	28.12	28.23
Female (%)	48.21	49.81	47.30	51.82	50.43	50.74	50.64
Elderly (65 + years) (%)	9.23	8.18	7.12	19.38	10.08	12.70	13.19
Kid (< 5 years) (%)	6.23	11.33	11.99	9.84	9.80	9.89	9.30
Native-born (%)	92.89	90.32	91.61	92.68	91.30	91.71	92.80
Renter housing units (%)	20.21	22.27	34.78	23.84	37.08	32.95	27.74
Education (%)	14.12	8.44	12.64	13.97	20.77	18.45	21.31
Unemployment (%)	12.74	10.17	8.92	7.56	6.49	6.85	7.36
Poverty (%)	26.30	22.84	20.52	13.05	14.66	14.42	16.47
Mean household income ($)	38,481	48,753	54,608	54,603	60,623	58,632	57,882
Year 2000							
Total population	2,112	15,826	62,558	570,281	1,149,152	1,799,929	3,330,703
White	1,615	11,767	45,916	398,763	841,429	1,299,490	2,572,225
Black	15	583	2,661	26,280	55,123	84,662	69,654
Asian	10	99	922	8,189	28,148	37,368	60,021
Native American	49	309	703	9,584	25,715	36,360	217,182
Others	423	3,073	12,357	127,445	198,728	342,026	411,644
Hispanic	712	5,260	20,013	208,105	347,341	581,431	713,886
Color	779	6,310	24,968	258,156	469,773	759,986	1,098,581
White (%)	76.47	74.35	73.40	69.92	73.22	72.20	77.23
Black (%)	0.71	3.68	4.25	4.61	4.80	4.70	2.09
Asian (%)	0.47	0.63	1.47	1.44	2.45	2.08	1.80
Native American (%)	2.32	1.95	1.12	1.68	2.24	2.02	6.52
Others (%)	20.03	19.42	19.75	22.35	17.29	19.00	12.36
Hispanic (%)	33.71	33.24	31.99	36.49	30.23	32.30	21.43
Color (%)	36.88	39.87	39.91	45.27	40.88	42.22	32.98
Female (%)	48.48	43.41	48.87	51.28	49.04	49.69	50.43
Elderly (65 + years) (%)	10.18	7.92	8.98	17.07	8.55	11.26	13.96
Kid (< 5 years) (%)	9.14	8.72	9.78	10.24	9.79	9.92	8.34
Native-born (%)	81.53	86.71	87.52	83.72	81.68	82.57	89.72
Renter housing units (%)	23.38	26.40	24.29	23.10	38.25	32.89	25.37
College degree or higher (%)	7.02	8.83	17.09	15.40	23.71	20.68	25.00
Unemployment (%)	6.13	5.84	4.55	5.80	5.62	5.64	5.63
Poverty (%)	21.02	17.93	12.74	13.00	15.61	14.70	13.48
Mean household income ($)	53,204	59,309	71,249	60,305	68,888	66,197	67,691
Year 2010							
Total population	3,090	41,543	164,444	805,703	1,193,109	2,207,889	4,038,927
White	2,446	32,437	132,810	612,665	929,449	1,709,807	3,173,799
Black	224	2,368	9,639	49,776	70,875	132,882	107,773
Asian	10	852	4,670	19,844	41,677	67,053	111,648
Native American	0	761	1,769	13,084	26,470	42,084	236,252
Others	410	5,125	15,556	110,334	124,638	256,063	409,455
Hispanic	1,066	16,096	49,966	357,283	402,723	827,134	987,540
Color	1,319	20,479	67,230	446,487	555,346	1,090,861	1,488,924
White (%)	79.16	78.08	80.76	76.04	77.90	77.44	78.58

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	7.25	5.70	5.86	6.18	5.94	6.02	2.67
Asian (%)	0.32	2.05	2.84	2.46	3.49	3.04	2.76
Native American (%)	0.00	1.83	1.08	1.62	2.22	1.91	5.85
Others (%)	13.27	12.34	9.46	13.69	10.45	11.60	10.14
Hispanic (%)	34.50	38.75	30.38	44.34	33.75	37.46	24.45
Color (%)	42.69	49.30	40.88	55.42	46.55	49.41	36.86
Female (%)	49.94	47.17	51.24	51.15	49.38	50.13	50.31
Elderly (65 + years) (%)	9.00	5.97	8.00	14.46	8.65	10.67	14.80
Kid (< 5 years) (%)	6.89	11.41	9.96	9.04	7.76	8.46	6.84
Native-born (%)	87.57	88.74	88.10	79.95	80.63	81.10	88.43
Renter housing units (%)	21.78	22.18	20.49	27.12	36.01	31.61	25.23
College degree or higher (%)	7.27	15.58	24.73	18.38	26.31	23.13	27.96
Unemployment (%)	10.90	7.32	7.31	8.89	7.15	7.75	7.60
Poverty (%)	21.23	12.79	9.81	16.41	18.84	17.18	14.21
Mean household income ($)	66,449	67,996	79,633	58,958	67,297	65,194	68,577
Index	3	3	3	3	3	3	3

Table B. 6

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Palo Verde Nuclear Generating Station in Arizona

Count		SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	1526	75.32	992	3,199.39	534	3,201.89	-2.492	(-0.03)
Black	1526	12.54	992	108.64	534	248.84	-140.2***	(-13.08)
Asian	1526	7.99	992	112.55	534	125.57	-13.02	(-1.59)
Native American	1526	25.65	992	238.16	534	78.81	159.3***	-4.68
Others	1526	24.22	992	412.76	534	479.52	-66.76**	(-2.71)
Hispanic	1526	68.58	992	995.50	534	1,548.94	-553.4***	(-8.51)
Color	1526	77.36	992	1,500.93	534	2,042.81	-541.9***	(-7.25)
White (2000)	1526	81.38	992	2,592.97	534	2,433.50	159.5*	-1.97
Black	1526	10.48	992	70.22	534	158.54	-88.33***	(-10.24)
Asian	1526	4.71	992	60.51	534	69.98	-9.472*	(-1.98)
Native American	1526	25.50	992	218.93	534	68.09	150.8***	-4.46
Others	1526	35.88	992	414.96	534	640.50	-225.5***	(-6.96)
Hispanic	1526	60.62	992	719.64	534	1,088.82	-369.2***	(-6.61)
Color	1526	71.83	992	1,107.44	534	1,423.20	-315.8***	(-4.62)
White (1990)	1526	81.43	992	1,931.60	534	1,969.16	-37.56	(-0.47)
Black	1526	10.60	992	50.23	534	112.78	-62.55***	(-7.23)
Asian	1526	2.98	992	33.81	534	38.56	-4.747	(-1.50)
Native American	1526	23.11	992	179.27	534	50.10	129.2***	-4.23
Others	1526	21.29	992	193.62	534	255.99	-62.37**	(-2.97)
Hispanic	1526	36.50	992	421.78	534	491.08	-69.3	(-1.91)
Color	1526	48.18	992	674.28	534	682.45	-8.172	(-0.16)

*p<0.05, **p<0.01, ***p<0.001

4. Arkansas Nuclear One, Arkansas

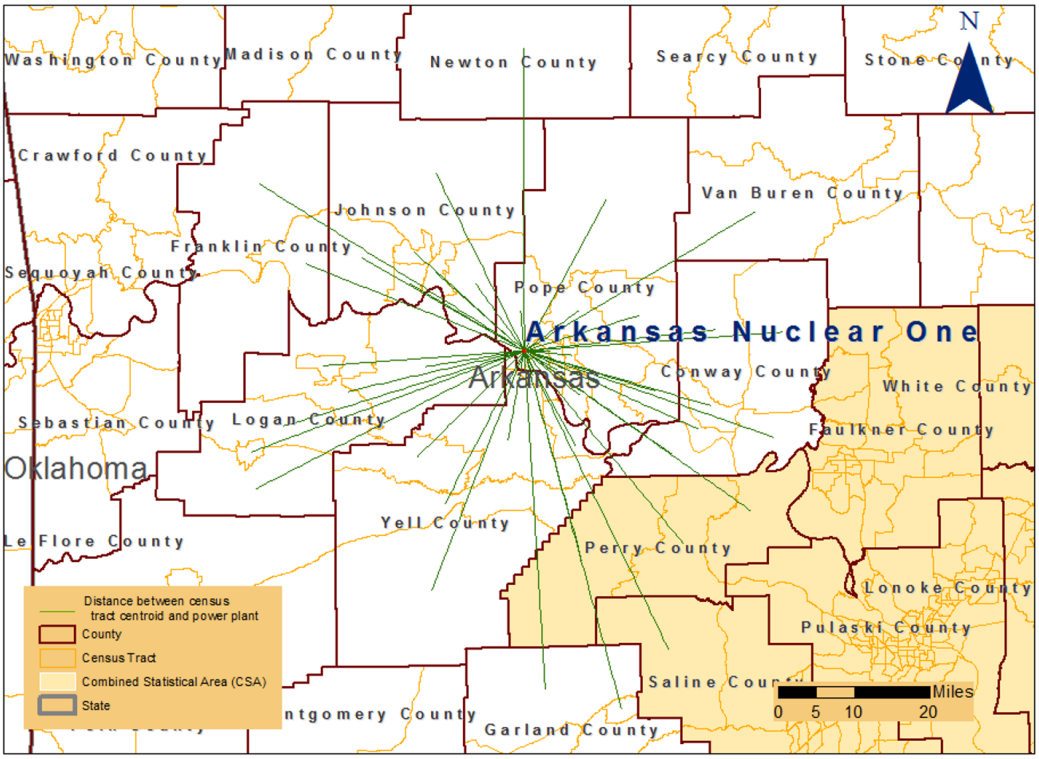

Figure B. 4 Distance to census-tract center points of census tracts within a 50-mile radius of Arkansas Nuclear One, Arkansas in 1990, 2000, and 2010

Table B. 7

Demographic Composition of Population, as sorted by Distance from Arkansas Nuclear One, Arkansas in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	8	10	12	11	4	45	641
Tract area (sq. mile)	196	851	1,943	2,258	799	6,046	47,133
Total population	32,038	34,024	38,439	38,745	11,044	154,290	2,196,442
White	30,524	32,899	36,164	36,706	10,898	147,191	1,797,202
Black	1,070	624	1,766	1,666	62	5,188	368,268
Asian	134	167	178	84	19	582	11,513
Native American	223	221	245	224	66	979	13,339
Others	93	106	87	63	0	349	6,109
Hispanic	292	315	273	279	53	1,212	18,372
Color	1,700	1,335	2,432	2,219	193	7,879	410,211
White (%)	95.27	96.69	94.08	94.74	98.68	95.40	81.82
Black (%)	3.34	1.83	4.59	4.30	0.56	3.36	16.77
Asian (%)	0.42	0.49	0.46	0.22	0.17	0.38	0.52
Native American (%)	0.70	0.65	0.64	0.58	0.60	0.63	0.61
Others (%)	0.29	0.31	0.23	0.16	0.00	0.23	0.28
Hispanic (%)	0.91	0.93	0.71	0.72	0.48	0.79	0.84
Color (%)	5.31	3.92	6.33	5.73	1.75	5.11	18.68
Female (%)	51.26	51.17	51.10	51.27	49.09	51.05	51.89
Elderly (65 + years) (%)	12.93	14.50	16.97	17.38	33.51	16.88	14.74
Kid (< 5 years) (%)	8.62	8.25	8.09	8.11	4.62	7.99	8.50
Native-born (%)	99.37	98.86	99.20	99.48	99.19	99.23	98.92
Renter housing units (%)	32.26	20.41	20.44	18.02	13.20	21.51	27.49
Education (%)	17.43	10.09	8.78	7.39	19.45	11.31	13.46
Unemployment (%)	6.33	6.03	7.60	7.77	5.48	6.88	6.75
Poverty (%)	14.10	17.28	18.65	21.98	13.54	17.89	19.15
Mean household income ($)	47,160	39,906	38,991	35,133	53,826	41,096	45,209
Year 2000							
Total population	37,734	41,883	42,616	44,654	15,982	182,869	2,490,531
White	34,594	39,037	38,594	41,468	15,478	169,171	1,967,995
Black	1,240	384	1,727	1,540	233	5,124	412,757
Asian	255	114	193	188	23	773	19,842
Native American	309	271	151	271	27	1,029	17,463
Others	1,341	2,072	1,951	1,186	225	6,775	72,471
Hispanic	1,167	2,331	2,090	692	184	6,464	79,112
Color	3,445	3,806	4,717	3,460	622	16,050	557,285
White (%)	91.68	93.20	90.56	92.87	96.85	92.51	79.02
Black (%)	3.29	0.92	4.05	3.45	1.46	2.80	16.57
Asian (%)	0.68	0.27	0.45	0.42	0.14	0.42	0.80
Native American (%)	0.82	0.65	0.35	0.61	0.17	0.56	0.70
Others (%)	3.55	4.95	4.58	2.66	1.41	3.70	2.91
Hispanic (%)	3.09	5.57	4.90	1.55	1.15	3.53	3.18
Color (%)	9.13	9.09	11.07	7.75	3.89	8.78	22.38
Female (%)	51.50	50.47	50.62	50.34	51.03	50.73	51.29
Elderly (65 + years) (%)	13.49	13.75	15.60	15.78	39.99	16.92	13.80
Kid (< 5 years) (%)	8.08	7.54	7.73	7.69	3.44	7.37	8.21
Native-born (%)	97.43	96.00	96.16	98.78	98.26	97.21	97.25
Renter housing units (%)	31.61	21.31	19.94	18.44	9.06	20.98	27.68
College degree or higher (%)	22.69	13.20	10.58	9.89	27.36	15.14	16.78
Unemployment (%)	6.17	6.62	5.56	5.64	6.42	6.02	6.10
Poverty (%)	14.44	15.36	16.39	17.20	7.09	15.13	15.89
Mean household income ($)	52,502	51,909	47,867	45,765	61,536	50,583	53,505
Year 2010							
Total population	43,212	44,933	44,141	45,623	17,054	194,963	2,677,721
White	38,960	42,063	39,805	42,668	16,321	179,817	2,074,058
Black	1,737	730	1,786	1,339	48	5,640	439,557
Asian	471	319	242	287	52	1,371	36,089
Native American	374	246	281	464	66	1,431	17,761
Others	1,670	1,575	2,027	865	567	6,704	110,256
Hispanic	3,402	4,384	3,533	972	317	12,608	155,819
Color	6,576	6,500	6,521	3,647	821	24,065	689,814
White (%)	90.16	93.61	90.18	93.52	95.70	92.23	77.46

Black (%)	4.02	1.62	4.05	2.93	0.28	2.89	16.42
Asian (%)	1.09	0.71	0.55	0.63	0.30	0.70	1.35
Native American (%)	0.87	0.55	0.64	1.02	0.39	0.73	0.66
Others (%)	3.86	3.51	4.59	1.90	3.32	3.44	4.12
Hispanic (%)	7.87	9.76	8.00	2.13	1.86	6.47	5.82
Color (%)	15.22	14.47	14.77	7.99	4.81	12.34	25.76
Female (%)	50.42	49.82	50.76	50.92	50.85	50.51	50.99
Elderly (65 + years) (%)	12.40	14.41	15.94	17.48	44.97	17.70	13.87
Kid (< 5 years) (%)	6.60	7.30	6.31	6.37	1.96	6.24	6.85
Native-born (%)	95.08	94.21	94.99	98.83	97.82	95.98	95.72
Renter housing units (%)	32.84	23.43	19.56	17.42	9.98	21.39	28.21
College degree or higher (%)	22.33	13.80	12.47	11.63	27.09	16.22	19.35
Unemployment (%)	6.28	7.74	7.24	6.72	8.87	7.09	7.90
Poverty (%)	17.63	17.86	16.99	20.15	10.03	17.46	18.05
Mean household income ($)	52,363	44,991	45,846	45,433	56,786	48,185	53,615
Index	4	4	4	4	4	4	4

Table B. 8

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Arkansas Nuclear One, Arkansas

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	686	1.41	641	74.84	45	92.13	-17.29***	(-12.29)
Black	686	1.30	641	19.39	45	3.04	16.36***	(12.62)
Asian	686	0.19	641	1.16	45	0.71	0.452*	(2.32)
Native American	686	0.12	641	0.63	45	0.68	-0.0439	(-0.37)
Others	686	0.61	641	3.81	45	3.44	0.371	(0.61)
Hispanic	686	1.30	641	5.28	45	6.75	-1.47	(-1.13)
Color	686	1.87	641	27.95	45	12.79	15.16***	(8.10)
White (2000)	686	1.44	641	78.00	45	92.20	-14.20***	(-9.83)
Black	686	1.32	641	17.73	45	3.00	14.73***	(11.14)
Asian	686	0.11	641	0.77	45	0.44	0.327**	(2.92)
Native American	686	0.08	641	0.70	45	0.57	0.138	(1.79)
Others	686	0.67	641	2.79	45	3.80	-1.004	(-1.51)
Hispanic	686	0.87	641	3.03	45	3.74	-0.711	(-0.82)
Color	686	1.54	641	23.33	45	9.19	14.13***	(9.16)
White (1990)	686	1.36	641	83.10	45	95.38	-12.28***	(-9.02)
Black	686	1.37	641	15.46	45	3.39	12.07***	(8.81)
Asian	686	0.09	641	0.48	45	0.39	0.09	(0.99)
Native American	686	0.08	641	0.65	45	0.61	0.0417	(0.51)
Others	686	0.06	641	0.30	45	0.22	0.0724	(1.13)
Hispanic	686	0.12	641	0.87	45	0.75	0.118	(0.95)
Color	686	1.36	641	17.42	45	5.09	12.34***	(9.07)

*p<0.05, **p<0.01, ***p<0.001

5. Diablo Canyon Nuclear Power Plant, California

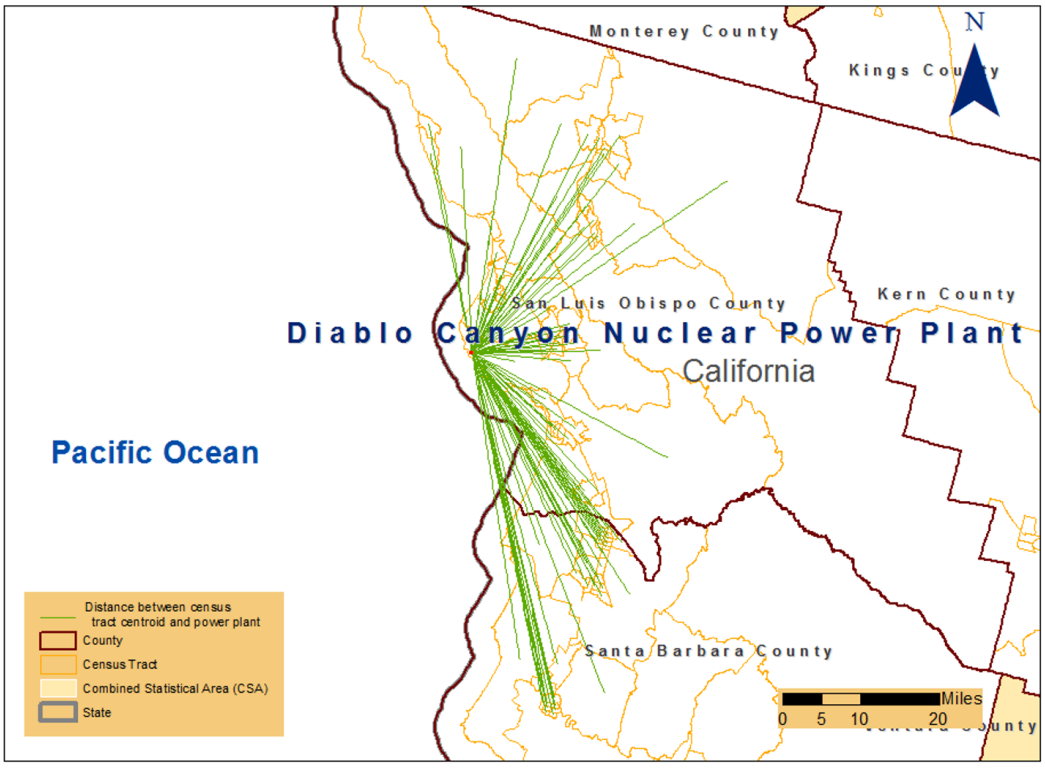

Figure B. 5 Distance to census-tract center points of census tracts within a 50-mile radius of Diablo Canyon Nuclear Power Plant, California in 1990, 2000, and 2010

Table B. 9

Demographic Composition of Population, as sorted by Distance from Diablo Canyon Nuclear Power Plant, California in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	7	23	27	22	11	90	7,967
Tract area (sq. mile)	358	181	1,051	1,352	106	3,048	160,647
Total population	39,157	89,483	107,194	80,430	45,168	361,432	29,398,594
White	36,325	77,343	77,687	68,790	33,571	293,716	20,261,924
Black	398	3,568	1,570	2,624	3,016	11,176	2,187,592
Asian	1,374	3,678	4,372	2,466	2,244	14,134	2,833,691
Native American	328	860	1,308	833	712	4,041	244,866
Others	768	4,011	22,240	5,714	5,618	38,351	3,870,512
Hispanic	3,136	11,985	36,995	12,530	9,663	74,309	7,483,224
Color	5,001	19,405	43,312	17,898	15,241	100,857	12,565,203
White (%)	92.77	86.43	72.47	85.53	74.32	81.26	68.92
Black (%)	1.02	3.99	1.46	3.26	6.68	3.09	7.44
Asian (%)	3.51	4.11	4.08	3.07	4.97	3.91	9.64
Native American (%)	0.84	0.96	1.22	1.04	1.58	1.12	0.83
Others (%)	1.96	4.48	20.75	7.10	12.44	10.61	13.17
Hispanic (%)	8.01	13.39	34.51	15.58	21.39	20.56	25.45
Color (%)	12.77	21.69	40.41	22.25	33.74	27.90	42.74
Female (%)	51.30	45.82	49.80	49.58	49.50	48.89	50.01
Elderly (65 + years) (%)	17.81	13.99	11.49	12.98	9.21	12.84	10.46
Kid (< 5 years) (%)	7.23	5.73	10.92	9.66	11.44	9.02	9.56
Native-born (%)	92.81	91.18	83.17	92.44	88.41	88.92	78.17
Renter housing units (%)	32.46	44.19	37.18	28.39	41.51	36.90	41.25
Education (%)	31.11	22.73	14.37	18.84	17.49	19.81	23.40
Unemployment (%)	3.76	6.14	6.93	5.65	6.95	6.09	6.65
Poverty (%)	9.40	18.65	14.44	7.20	13.02	13.00	12.50
Mean household income ($)	72,435	58,966	62,857	70,037	62,859	64,682	76,051
Year 2000							
Total population	40,444	97,522	130,641	92,047	48,908	409,562	33,462,086
White	35,637	81,088	89,862	74,754	33,562	314,903	19,808,056
Black	376	2,814	1,774	1,807	3,177	9,948	2,209,242
Asian	1,417	3,865	4,099	3,000	1,981	14,362	3,782,471
Native American	247	693	1,584	830	817	4,171	308,044
Others	2,810	9,033	33,303	11,656	9,359	66,161	7,354,290
Hispanic	4,324	16,140	57,347	19,507	15,974	113,292	10,855,840
Color	7,169	25,603	66,358	27,243	22,890	149,263	17,951,222
White (%)	88.11	83.15	68.79	81.21	68.62	76.89	59.20
Black (%)	0.93	2.89	1.36	1.96	6.50	2.43	6.60
Asian (%)	3.50	3.96	3.14	3.26	4.05	3.51	11.30
Native American (%)	0.61	0.71	1.21	0.90	1.67	1.02	0.92
Others (%)	6.95	9.26	25.49	12.66	19.14	16.15	21.98
Hispanic (%)	10.69	16.55	43.90	21.19	32.66	27.66	32.44
Color (%)	17.73	26.25	50.79	29.60	46.80	36.44	53.65
Female (%)	51.37	46.66	49.13	50.67	47.92	48.96	50.29
Elderly (65 + years) (%)	19.20	13.93	11.20	15.02	11.21	13.50	10.55
Kid (< 5 years) (%)	5.69	5.00	9.34	7.70	8.79	7.51	8.84
Native-born (%)	91.40	91.12	77.10	89.17	83.63	85.34	73.69
Renter housing units (%)	32.04	43.83	35.79	27.02	41.32	36.00	40.64
College degree or higher (%)	37.33	27.66	15.47	21.37	17.39	22.35	26.67
Unemployment (%)	4.18	7.79	6.94	5.78	8.50	6.76	7.02
Poverty (%)	11.02	17.80	15.49	9.44	13.34	13.88	14.22
Mean household income ($)	75,723	62,642	64,956	72,633	64,607	67,384	81,943
Year 2010							
Total population	27,776	108,423	157,599	104,511	49,983	448,292	36,189,000
White	23,841	89,252	130,401	84,814	33,275	361,583	22,031,130
Black	90	3,469	2,187	2,303	2,744	10,793	2,235,518
Asian	1,538	4,780	5,083	3,957	1,708	17,066	4,870,615
Native American	148	866	1,375	1,111	761	4,261	279,367
Others	2,159	10,056	18,553	12,326	11,495	54,589	6,772,368
Hispanic	4,023	19,014	78,580	31,345	22,195	155,157	13,301,000
Color	6,652	30,258	87,482	40,018	28,213	192,623	21,337,624
White (%)	85.83	82.32	82.74	81.15	66.57	80.66	60.88

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	0.32	3.20	1.39	2.20	5.49	2.41	6.18
Asian (%)	5.54	4.41	3.23	3.79	3.42	3.81	13.46
Native American (%)	0.53	0.80	0.87	1.06	1.52	0.95	0.77
Others (%)	7.77	9.27	11.77	11.79	23.00	12.18	18.71
Hispanic (%)	14.48	17.54	49.86	29.99	44.41	34.61	36.75
Color (%)	23.95	27.91	55.51	38.29	56.45	42.97	58.96
Female (%)	50.04	46.95	49.56	51.10	47.76	49.12	50.27
Elderly (65 + years) (%)	16.26	14.70	11.11	14.49	10.58	13.02	11.06
Kid (< 5 years) (%)	5.32	3.68	8.10	7.12	7.48	6.56	6.95
Native-born (%)	89.02	90.48	75.29	86.82	76.47	82.63	72.69
Renter housing units (%)	32.40	43.05	36.24	27.95	43.16	36.55	39.00
College degree or higher (%)	38.33	32.63	19.80	24.50	17.11	24.92	30.12
Unemployment (%)	5.77	7.80	8.21	7.29	8.86	7.79	9.00
Poverty (%)	14.25	17.98	14.37	8.29	15.62	13.82	13.71
Mean household income ($)	78,370	67,640	73,873	76,408	65,405	72,270	83,626
Index	5	5	5	5	5	5	5

Table B. 10

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Diablo Canyon Nuclear Power Plant, California

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	8057	1.49	7967	61.12	90	80.11	-18.99***	(-12.76)
Black	8057	0.51	7967	6.19	90	2.45	3.742***	(7.27)
Asian	8057	0.35	7967	13.02	90	3.81	9.207***	(26.04)
Native American	8057	0.11	7967	0.79	90	0.93	-0.145	(-1.37)
Others	8057	0.78	7967	18.23	90	11.58	6.643***	(8.53)
Hispanic	8057	2.53	7967	35.35	90	31.69	3.661	(1.45)
Color	8057	2.60	7967	57.15	90	40.08	17.07***	(6.57)
White (2000)	8057	1.51	7967	60.30	90	78.73	-18.42***	(-12.22)
Black	8057	0.47	7967	6.58	90	2.45	4.138***	(8.82)
Asian	8057	0.29	7967	10.96	90	3.32	7.635***	(26.32)
Native American	8057	0.09	7967	0.96	90	1.00	-0.0393	(-0.45)
Others	8057	1.35	7967	21.09	90	14.47	6.625***	(4.90)
Hispanic	8057	2.23	7967	31.07	90	24.90	6.168**	(2.76)
Color	8057	2.35	7967	51.95	90	33.55	18.40***	(7.82)
White (1990)	8057	1.62	7967	69.83	90	82.81	-12.97***	(-8.03)
Black	8057	0.57	7967	7.14	90	2.92	4.219***	(7.34)
Asian	8057	0.32	7967	9.17	90	3.66	5.508***	(17.34)
Native American	8057	0.08	7967	0.89	90	1.10	-0.205*	(-2.56)
Others	8057	1.33	7967	12.56	90	9.49	3.078*	(2.32)
Hispanic	8057	1.81	7967	24.32	90	18.84	5.477**	(3.02)
Color	8057	2.03	7967	40.93	90	25.84	15.09***	(7.43)

*p<0.05, **p<0.01, ***p<0.001

6. San Onofre Nuclear Generating Station, California

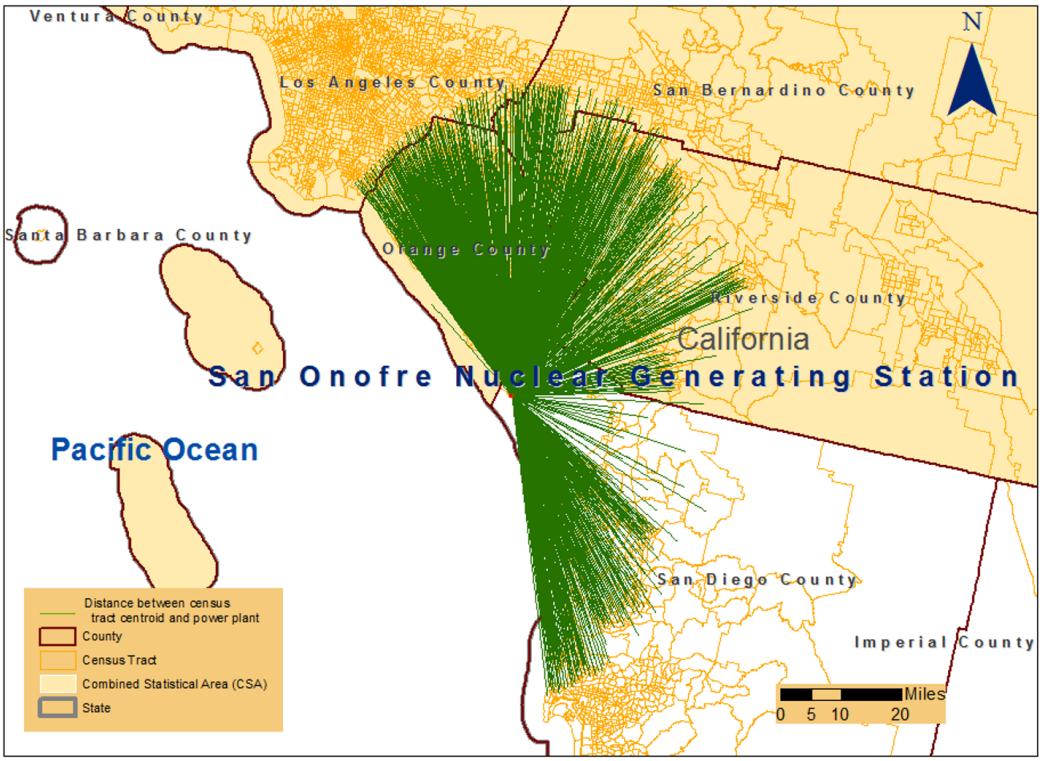

Figure B. 6 Distance to census-tract center points of census tracts within a 50-mile radius of San Onofre Nuclear Generating Station, California in 1990, 2000, and 2010

Table B. 11

Demographic Composition of Population, as sorted by Distance from San Onofre Nuclear Generating Station, California in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	14	120	236	451	520	1,341	6,716
Tract area (sq. mile)	238	401	911	1,495	859	3,905	159,789
Total population	80,106	415,784	785,875	1,791,173	2,004,153	5,077,091	24,682,936
White	65,912	348,836	674,695	1,372,927	1,504,056	3,966,426	16,589,213
Black	5,832	13,276	14,285	42,193	96,312	171,898	2,026,870
Asian	2,827	22,712	51,741	181,508	194,720	453,508	2,394,317
Native American	886	2,355	4,384	13,138	12,905	33,668	215,239
Others	4,647	28,578	40,829	181,349	196,190	451,593	3,457,270
Hispanic	10,319	65,206	111,538	482,733	421,391	1,091,187	6,466,346
Color	19,353	101,990	179,163	711,051	715,512	1,727,069	10,938,991
White (%)	82.28	83.90	85.85	76.65	75.05	78.12	67.21
Black (%)	7.28	3.19	1.82	2.36	4.81	3.39	8.21
Asian (%)	3.53	5.46	6.58	10.13	9.72	8.93	9.70
Native American (%)	1.11	0.57	0.56	0.73	0.64	0.66	0.87
Others (%)	5.80	6.87	5.20	10.12	9.79	8.89	14.01
Hispanic (%)	12.88	15.68	14.19	26.95	21.03	21.49	26.20
Color (%)	24.16	24.53	22.80	39.70	35.70	34.02	44.32
Female (%)	41.53	50.76	49.74	49.05	49.90	49.51	50.09
Elderly (65 + years) (%)	8.64	12.52	11.01	8.86	9.65	9.80	10.63
Kid (< 5 years) (%)	9.87	9.50	8.95	9.67	9.30	9.40	9.58
Native-born (%)	90.73	84.73	84.31	74.78	82.43	80.34	77.88
Renter housing units (%)	42.74	30.44	34.65	36.42	36.46	35.68	42.29
Education (%)	28.42	30.84	32.71	23.67	24.86	26.28	22.76
Unemployment (%)	3.77	4.54	4.36	5.63	5.24	5.17	6.97
Poverty (%)	6.49	6.76	7.19	9.93	8.39	8.58	13.31
Mean household income ($)	91,261	94,066	96,917	86,608	80,651	86,710	73,732
Year 2000							
Total population	91,169	562,006	1,020,157	2,144,256	2,239,667	6,057,255	27,814,392
White	73,261	430,480	764,454	1,316,002	1,356,309	3,940,506	16,182,453
Black	4,092	15,740	19,943	53,116	119,887	212,778	2,006,412
Asian	2,693	36,863	92,454	280,107	299,487	711,604	3,085,229
Native American	936	2,910	6,053	17,821	17,432	45,152	267,063
Others	10,186	75,972	137,320	477,097	446,618	1,147,193	6,273,258
Hispanic	15,820	119,322	201,720	764,561	677,152	1,778,575	9,190,557
Color	25,730	187,685	346,318	1,153,772	1,166,846	2,880,351	15,220,134
White (%)	80.36	76.60	74.93	61.37	60.56	65.05	58.18
Black (%)	4.49	2.80	1.95	2.48	5.35	3.51	7.21
Asian (%)	2.95	6.56	9.06	13.06	13.37	11.75	11.09
Native American (%)	1.03	0.52	0.59	0.83	0.78	0.75	0.96
Others (%)	11.17	13.52	13.46	22.25	19.94	18.94	22.55
Hispanic (%)	17.35	21.23	19.77	35.66	30.23	29.36	33.04
Color (%)	28.22	33.40	33.95	53.81	52.10	47.55	54.72
Female (%)	43.05	51.06	50.69	49.87	50.60	50.28	50.27
Elderly (65 + years) (%)	9.41	11.63	10.98	9.35	10.18	10.15	10.69
Kid (< 5 years) (%)	9.67	8.79	8.50	9.68	8.65	9.02	8.78
Native-born (%)	88.66	81.07	80.04	69.31	75.82	74.91	73.60
Renter housing units (%)	41.91	29.76	33.27	35.64	36.93	35.17	41.70
College degree or higher (%)	33.06	35.86	36.90	25.91	27.79	29.59	25.98
Unemployment (%)	4.23	4.27	4.70	5.66	6.04	5.48	7.36
Poverty (%)	7.50	7.76	8.13	11.64	11.22	10.47	15.04
Mean household income ($)	99,375	102,071	100,671	89,440	80,544	89,604	80,101
Year 2010							
Total population	104,718	613,138	1,261,234	2,324,246	2,476,596	6,779,932	29,857,358
White	79,500	457,839	896,980	1,408,228	1,433,552	4,276,099	18,116,614
Black	4,374	13,472	30,654	60,982	132,748	242,230	2,004,081
Asian	4,392	47,927	169,751	374,234	404,092	1,000,396	3,887,285
Native American	1,127	2,764	7,060	14,019	15,506	40,476	243,152
Others	15,325	91,136	156,789	466,783	490,698	1,220,731	5,606,226
Hispanic	19,309	146,274	300,585	921,285	906,869	2,294,322	11,161,835
Color	32,557	226,175	536,155	1,404,948	1,501,020	3,700,855	17,829,392
White (%)	75.92	74.67	71.12	60.59	57.88	63.07	60.68

Black (%)	4.18	2.20	2.43	2.62	5.36	3.57	6.71
Asian (%)	4.19	7.82	13.46	16.10	16.32	14.76	13.02
Native American (%)	1.08	0.45	0.56	0.60	0.63	0.60	0.81
Others (%)	14.63	14.86	12.43	20.08	19.81	18.01	18.78
Hispanic (%)	18.44	23.86	23.83	39.64	36.62	33.84	37.38
Color (%)	31.09	36.89	42.51	60.45	60.61	54.59	59.72
Female (%)	42.98	50.54	50.59	50.06	50.72	50.33	50.24
Elderly (65 + years) (%)	9.17	12.60	10.54	10.38	10.45	10.62	11.19
Kid (< 5 years) (%)	7.93	6.49	6.74	7.13	6.70	6.85	6.97
Native-born (%)	88.59	79.66	78.36	68.64	73.75	73.62	72.62
Renter housing units (%)	41.62	29.89	33.17	34.16	35.71	34.20	39.98
College degree or higher (%)	37.62	40.27	41.33	29.46	31.72	33.67	29.25
Unemployment (%)	6.96	7.04	7.18	8.84	8.48	8.21	9.17
Poverty (%)	8.21	7.42	8.92	11.38	10.92	10.35	14.48
Mean household income ($)	101,122	107,448	103,160	92,268	84,274	93,213	81,359
Index	6	6	6	6	6	6	6

Table B. 12

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding San Onofre Nuclear Generating Station, California

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	8057	0.58	6716	60.74	1341	64.30	-3.550***	(-6.12)
Black	8057	0.18	6716	6.69	1341	3.42	3.270***	(18.06)
Asian	8057	0.43	6716	12.73	1341	13.87	-1.140**	(-2.62)
Native American	8057	0.04	6716	0.83	1341	0.59	0.240***	(6.46)
Others	8057	0.41	6716	18.34	1341	17.23	1.107**	(2.70)
Hispanic	8057	0.73	6716	35.86	1341	32.53	3.333***	(4.56)
Color	8057	0.76	6716	57.90	1341	52.26	5.641***	(7.47)
White (2000)	8057	0.57	6716	59.23	1341	66.89	-7.655***	(-13.35)
Black	8057	0.19	6716	7.14	1341	3.53	3.610***	(18.52)
Asian	8057	0.37	6716	10.84	1341	11.00	-0.156	(-0.42)
Native American	8057	0.04	6716	1.00	1341	0.75	0.254***	(7.09)
Others	8057	0.43	6716	21.68	1341	17.73	3.944***	(9.14)
Hispanic	8057	0.68	6716	31.71	1341	27.45	4.264***	(6.24)
Color	8057	0.74	6716	53.10	1341	44.95	8.144***	(11.07)
White (1990)	8057	0.53	6716	68.22	1341	78.78	-10.56***	(-20.11)
Black	8057	0.22	6716	7.88	1341	3.11	4.772***	(22.08)
Asian	8057	0.26	6716	9.29	1341	8.18	1.104***	(4.17)
Native American	8057	0.06	6716	0.92	1341	0.75	0.168**	(3.05)
Others	8057	0.32	6716	13.40	1341	8.16	5.237***	(16.20)
Hispanic	8057	0.56	6716	25.19	1341	19.62	5.570***	(9.96)
Color	8057	0.65	6716	42.66	1341	31.24	11.42***	(17.52)

*p<0.05, **p<0.01, ***p<0.001

7. Millstone Power Station, Connecticut

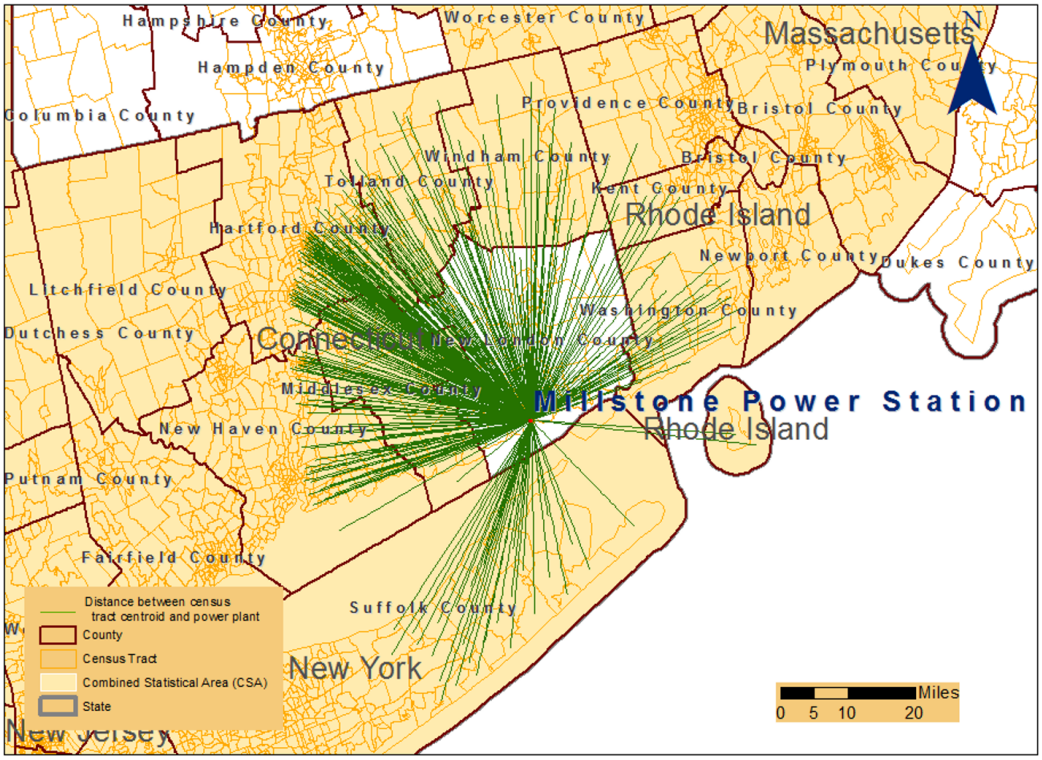

Figure B. 7 Distance to census-tract center points of census tracts within a 50-mile radius of Millstone Power Station, Connecticut in 1990, 2000, and 2010

Table B. 13

Demographic Composition of Population, as sorted by Distance from Millstone Power Station, Connecticut in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	32	47	56	161	99	395	5,601
Tract area (sq. mile)	266	1,698	1,112	1,375	651	5,103	56,540
Total population	118,811	177,020	230,951	629,978	365,327	1,522,087	20,758,812
White	104,298	169,316	221,012	588,085	269,809	1,352,520	15,827,065
Black	8,990	4,061	5,988	22,550	56,558	98,147	3,073,983
Asian	2,059	1,908	1,434	8,264	6,058	19,723	736,121
Native American	604	752	813	2,186	1,062	5,417	64,730
Others	2,863	978	1,715	8,896	31,835	46,287	1,056,919
Hispanic	5,706	3,328	4,360	23,402	52,940	89,736	2,309,453
Color	17,009	10,018	12,513	56,031	113,106	208,677	5,922,545
White (%)	87.78	95.65	95.70	93.35	73.85	88.86	76.24
Black (%)	7.57	2.29	2.59	3.58	15.48	6.45	14.81
Asian (%)	1.73	1.08	0.62	1.31	1.66	1.30	3.55
Native American (%)	0.51	0.42	0.35	0.35	0.29	0.36	0.31
Others (%)	2.41	0.55	0.74	1.41	8.71	3.04	5.09
Hispanic (%)	4.80	1.88	1.89	3.71	14.49	5.90	11.13
Color (%)	14.32	5.66	5.42	8.89	30.96	13.71	28.53
Female (%)	48.26	50.85	50.79	51.88	51.88	51.31	52.08
Elderly (65 + years) (%)	12.72	13.90	12.49	14.80	12.15	13.55	13.26
Kid (< 5 years) (%)	8.79	8.37	8.39	7.61	9.00	8.24	8.29
Native-born (%)	95.35	95.72	95.83	92.94	89.25	93.00	84.97
Renter housing units (%)	35.27	24.61	17.99	28.65	45.72	30.88	42.70
Education (%)	23.61	23.75	27.76	24.41	20.54	23.89	23.64
Unemployment (%)	6.05	5.42	4.95	4.56	6.79	5.35	6.73
Poverty (%)	6.33	5.37	5.19	5.34	14.03	7.50	12.28
Mean household income ($)	70,684	77,408	86,104	77,147	64,401	74,916	74,244
Year 2000							
Total population	115,203	188,366	257,325	666,051	362,705	1,589,650	21,840,692
White	95,049	172,513	239,689	580,046	244,041	1,331,338	15,228,340
Black	8,948	5,042	5,792	34,218	56,329	110,329	3,227,051
Asian	3,031	2,475	2,820	14,919	9,431	32,676	1,127,550
Native American	740	1,619	836	2,520	1,042	6,757	87,100
Others	7,456	6,702	8,199	34,364	51,848	108,569	2,170,631
Hispanic	8,583	6,851	10,193	50,324	65,674	141,625	3,132,790
Color	23,862	19,475	23,021	109,403	137,811	313,572	7,858,900
White (%)	82.51	91.58	93.15	87.09	67.28	83.75	69.72
Black (%)	7.77	2.68	2.25	5.14	15.53	6.94	14.78
Asian (%)	2.63	1.31	1.10	2.24	2.60	2.06	5.16
Native American (%)	0.64	0.86	0.32	0.38	0.29	0.43	0.40
Others (%)	6.47	3.56	3.19	5.16	14.29	6.83	9.94
Hispanic (%)	7.45	3.64	3.96	7.56	18.11	8.91	14.34
Color (%)	20.71	10.34	8.95	16.43	38.00	19.73	35.98
Female (%)	50.99	50.87	50.98	51.84	51.82	51.52	51.85
Elderly (65 + years) (%)	14.29	14.28	13.18	14.75	12.18	13.82	13.06
Kid (< 5 years) (%)	7.83	7.39	7.55	7.21	8.26	7.57	7.86
Native-born (%)	93.52	94.49	94.35	91.43	87.42	91.50	80.67
Renter housing units (%)	33.36	23.66	16.94	28.78	43.93	29.76	42.07
College degree or higher (%)	28.60	29.06	33.64	28.51	23.68	28.37	27.85
Unemployment (%)	4.59	4.08	4.33	4.50	7.43	5.07	6.87
Poverty (%)	7.22	5.86	5.09	7.12	14.99	8.45	13.86
Mean household income ($)	78,503	81,782	93,395	80,057	66,283	79,102	78,923
Year 2010							
Total population	118,025	201,538	259,552	708,022	380,788	1,667,925	22,164,052
White	94,588	174,106	240,142	591,583	251,480	1,351,899	15,075,107
Black	8,032	7,211	6,350	38,874	61,244	121,711	3,273,726
Asian	5,210	6,954	3,637	25,273	14,822	55,896	1,504,402
Native American	457	1,401	841	1,958	1,292	5,949	73,407
Others	9,738	11,866	8,582	50,334	51,950	132,470	2,237,411
Hispanic	12,836	13,482	14,476	82,304	77,811	200,909	3,659,514
Color	28,679	33,599	28,663	157,284	159,913	408,138	8,663,811
White (%)	80.14	86.39	92.52	83.55	66.04	81.05	68.02

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	6.81	3.58	2.45	5.49	16.08	7.30	14.77
Asian (%)	4.41	3.45	1.40	3.57	3.89	3.35	6.79
Native American (%)	0.39	0.70	0.32	0.28	0.34	0.36	0.33
Others (%)	8.25	5.89	3.31	7.11	13.64	7.94	10.09
Hispanic (%)	10.88	6.69	5.58	11.62	20.43	12.05	16.51
Color (%)	24.30	16.67	11.04	22.21	42.00	24.47	39.09
Female (%)	50.76	50.49	50.47	51.45	51.25	51.09	51.63
Elderly (65 + years) (%)	15.09	15.77	15.10	14.66	12.10	14.31	13.35
Kid (< 5 years) (%)	5.47	5.47	5.05	5.13	6.41	5.47	6.01
Native-born (%)	90.86	90.75	93.38	89.22	84.96	89.20	79.23
Renter housing units (%)	30.91	21.27	13.56	25.61	40.87	26.78	38.99
College degree or higher (%)	33.29	33.20	37.91	32.62	27.32	32.43	32.51
Unemployment (%)	6.86	5.83	5.87	7.30	10.07	7.49	7.56
Poverty (%)	7.63	6.90	4.96	8.91	16.13	9.61	13.61
Mean household income ($)	80,662	88,699	101,587	82,663	67,734	82,791	82,038
Index	7	7	7	7	7	7	7

Table B. 14

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Millstone Power Station, Connecticut

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	5996	1.30	5601	66.10	395	77.35	-11.25***	(-8.65)
Black	5996	0.80	5601	15.83	395	8.60	7.226***	(9.03)
Asian	5996	0.25	5601	6.75	395	3.23	3.521***	(13.84)
Native American	5996	0.06	5601	0.43	395	0.36	0.0729	(1.15)
Others	5996	0.61	5601	9.57	395	8.94	0.627	(1.02)
Hispanic	5996	0.90	5601	15.66	395	13.75	1.903*	(2.11)
Color	5996	1.43	5601	39.45	395	27.19	12.25***	(8.60)
White (2000)	5996	1.21	5601	68.38	395	81.17	-12.79***	(-10.53)
Black	5996	0.80	5601	15.81	395	8.27	7.540***	(9.39)
Asian	5996	0.16	5601	5.17	395	2.02	3.154***	(20.07)
Native American	5996	0.06	5601	0.49	395	0.42	0.0732	(1.27)
Others	5996	0.60	5601	9.77	395	7.87	1.896**	(3.17)
Hispanic	5996	0.81	5601	13.73	395	10.50	3.231***	(3.98)
Color	5996	1.36	5601	36.43	395	22.60	13.83***	(10.19)
White (1990)	5996	1.10	5601	75.02	395	87.74	-12.73***	(-11.53)
Black	5996	0.82	5601	15.47	395	7.02	8.453***	(10.36)
Asian	5996	0.11	5601	3.53	395	1.24	2.289***	(20.93)
Native American	5996	0.06	5601	0.38	395	0.37	0.0151	(0.27)
Others	5996	0.45	5601	5.05	395	3.37	1.679***	(3.74)
Hispanic	5996	0.66	5601	10.99	395	6.52	4.471***	(6.75)
Color	5996	1.20	5601	29.17	395	14.81	14.36***	(11.96)

*p<0.05, **p<0.01, ***p<0.001

8. Crystal River Nuclear Generating Plant, Florida

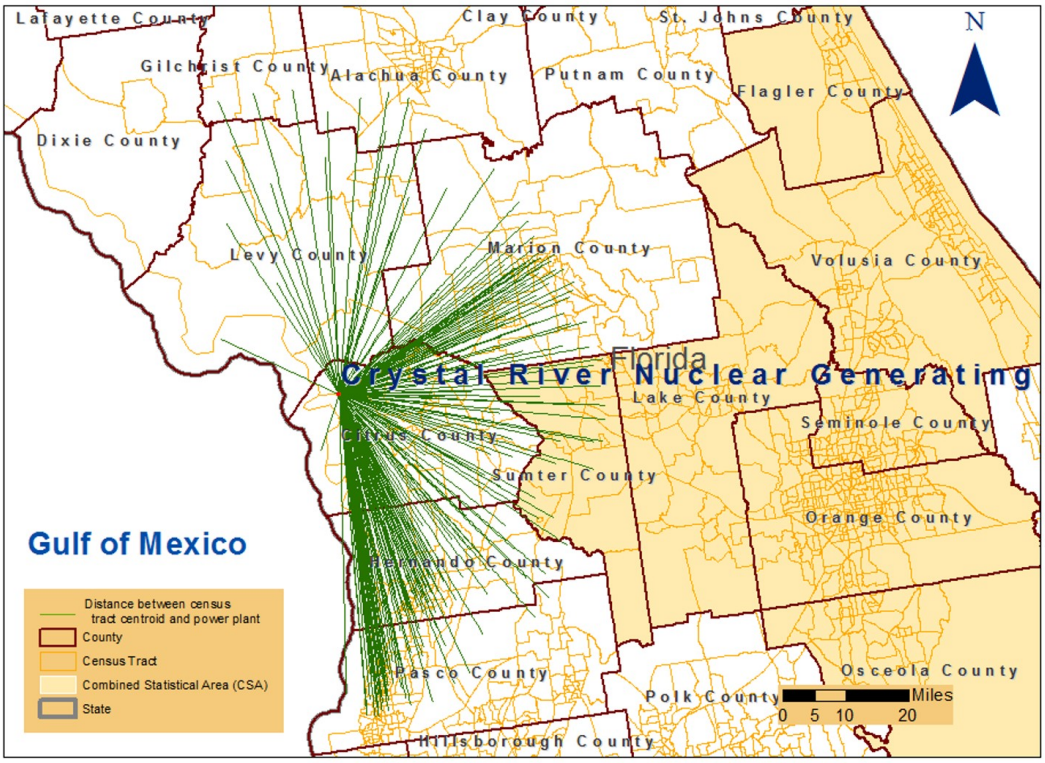

Figure B. 8 Distance to census-tract center points of census tracts within a 50-mile radius of Crystal River Nuclear Generating Plant, Florida in 1990, 2000, and 2010

Table B. 15

Demographic Composition of Population, as sorted by Distance from Crystal River Nuclear Generating Plant, Florida in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	5	17	29	77	72	200	4,045
Tract area (sq. mile)	346	422	1,542	1,268	1,147	4,726	61,032
Total population	16,682	57,513	68,418	209,769	191,134	543,516	12,394,385
White	16,090	55,026	65,344	182,803	175,805	495,068	10,260,648
Black	400	1,714	2,130	23,921	12,817	40,982	1,714,956
Asian	120	329	171	1,011	858	2,489	147,712
Native American	32	413	405	862	672	2,384	40,229
Others	37	38	373	1,167	996	2,611	230,836
Hispanic	240	752	1,887	5,523	4,737	13,139	1,541,909
Color	798	3,207	4,510	31,232	18,792	58,539	3,390,654
White (%)	96.45	95.68	95.51	87.14	91.98	91.09	82.78
Black (%)	2.40	2.98	3.11	11.40	6.71	7.54	13.84
Asian (%)	0.72	0.57	0.25	0.48	0.45	0.46	1.19
Native American (%)	0.19	0.72	0.59	0.41	0.35	0.44	0.32
Others (%)	0.22	0.07	0.55	0.56	0.52	0.48	1.86
Hispanic (%)	1.44	1.31	2.76	2.63	2.48	2.42	12.44
Color (%)	4.78	5.58	6.59	14.89	9.83	10.77	27.36
Female (%)	51.08	52.04	52.18	51.98	51.84	51.93	51.64
Elderly (65 + years) (%)	21.92	34.26	30.60	23.62	27.67	27.00	17.93
Kid (< 5 years) (%)	7.21	5.25	5.79	7.24	6.71	6.66	7.87
Native-born (%)	96.97	94.63	95.11	95.94	95.39	95.54	86.78
Renter housing units (%)	18.01	11.92	12.01	20.29	15.96	16.60	28.08
Education (%)	12.82	10.39	9.93	11.06	10.13	10.56	18.64
Unemployment (%)	7.40	7.27	6.35	6.75	6.08	6.53	5.76
Poverty (%)	16.83	11.78	12.03	14.28	13.31	13.47	12.66
Mean household income ($)	50,529	45,274	45,250	47,246	44,608	45,941	60,583
Year 2000							
Total population	18,941	78,615	100,435	260,828	238,921	697,740	15,284,638
White	17,864	74,087	93,043	222,640	214,209	621,843	11,841,459
Black	322	2,238	3,553	28,301	15,572	49,986	2,262,119
Asian	257	884	347	2,024	2,149	5,661	265,528
Native American	103	82	426	992	827	2,430	51,998
Others	391	1,326	3,080	6,847	6,207	17,851	863,503
Hispanic	475	1,997	5,916	13,837	11,070	33,295	2,647,019
Color	1,411	6,014	11,144	47,494	32,134	98,197	5,427,723
White (%)	94.31	94.24	92.64	85.36	89.66	89.12	77.47
Black (%)	1.70	2.85	3.54	10.85	6.52	7.16	14.80
Asian (%)	1.36	1.12	0.35	0.78	0.90	0.81	1.74
Native American (%)	0.54	0.10	0.42	0.38	0.35	0.35	0.34
Others (%)	2.06	1.69	3.07	2.63	2.60	2.56	5.65
Hispanic (%)	2.51	2.54	5.89	5.31	4.63	4.77	17.32
Color (%)	7.45	7.65	11.10	18.21	13.45	14.07	35.51
Female (%)	51.14	52.20	51.95	52.00	51.29	51.75	51.25
Elderly (65 + years) (%)	23.12	34.87	33.39	24.04	25.69	27.15	17.12
Kid (< 5 years) (%)	5.49	4.29	4.90	6.33	5.89	5.72	7.17
Native-born (%)	95.50	94.71	94.75	95.17	94.22	94.74	82.77
Renter housing units (%)	15.35	11.00	10.12	18.44	15.44	15.15	26.49
College degree or higher (%)	16.11	14.07	12.59	13.38	13.80	13.56	22.77
Unemployment (%)	7.31	7.31	5.78	5.51	4.80	5.53	5.57
Poverty (%)	12.32	11.27	11.12	13.20	12.24	12.33	12.52
Mean household income ($)	55,592	51,132	51,115	53,670	52,238	52,546	67,343
Year 2010							
Total population	21,423	99,241	129,287	325,804	308,587	884,342	17,627,278
White	19,899	91,194	115,821	271,278	273,972	772,164	13,343,064
Black	432	4,291	6,466	36,802	20,495	68,486	2,831,926
Asian	203	1,678	1,062	4,626	5,281	12,850	442,531
Native American	96	347	326	855	674	2,298	52,272
Others	793	1,731	5,612	12,243	8,165	28,544	957,485
Hispanic	1,097	4,321	14,203	30,792	23,936	74,349	3,920,975
Color	2,088	11,530	23,268	76,596	53,365	166,847	7,412,517
White (%)	92.89	91.89	89.58	83.26	88.78	87.32	75.70

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	2.02	4.32	5.00	11.30	6.64	7.74	16.07
Asian (%)	0.95	1.69	0.82	1.42	1.71	1.45	2.51
Native American (%)	0.45	0.35	0.25	0.26	0.22	0.26	0.30
Others (%)	3.70	1.74	4.34	3.76	2.65	3.23	5.43
Hispanic (%)	5.12	4.35	10.99	9.45	7.76	8.41	22.24
Color (%)	9.75	11.62	18.00	23.51	17.29	18.87	42.05
Female (%)	51.02	51.58	52.03	51.55	50.96	51.41	51.10
Elderly (65 + years) (%)	25.30	33.15	30.13	21.83	26.63	26.07	16.47
Kid (< 5 years) (%)	3.90	3.89	4.24	5.48	4.67	4.80	5.89
Native-born (%)	95.78	94.16	91.69	93.51	93.03	93.20	80.20
Renter housing units (%)	13.69	11.71	11.51	19.86	14.67	15.61	24.91
College degree or higher (%)	19.04	17.11	15.94	16.59	19.82	17.77	26.35
Unemployment (%)	12.15	12.74	11.04	11.78	9.69	11.06	8.79
Poverty (%)	14.87	14.89	13.24	15.18	13.00	14.10	13.81
Mean household income ($)	51,385	51,560	50,558	53,985	56,540	54,029	66,986
Index	8	8	8	8	8	8	8

Table B. 16

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Crystal River Nuclear Generating Plant, Florida

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	4245	1.39	4045	75.49	200	85.88	-10.39***	(-7.49)
Black	4245	1.00	4045	15.28	200	7.69	7.588***	(7.56)
Asian	4245	0.12	4045	2.24	200	1.28	0.963***	(7.97)
Native American	4245	0.04	4045	0.30	200	0.25	0.0481	(1.09)
Others	4245	0.23	4045	4.91	200	2.90	2.013***	(8.90)
Hispanic	4245	0.59	4045	19.83	200	7.82	12.01***	(20.52)
Color	4245	1.20	4045	38.53	200	18.05	20.48***	(17.04)
White (2000)	4245	1.09	4045	78.91	200	88.96	-10.05***	(-9.25)
Black	4245	0.93	4045	13.76	200	6.95	6.808***	(7.32)
Asian	4245	0.07	4045	1.66	200	0.75	0.906***	(13.11)
Native American	4245	0.04	4045	0.34	200	0.36	-0.0157	(-0.38)
Others	4245	0.16	4045	5.24	200	2.49	2.751***	(16.77)
Hispanic	4245	0.44	4045	15.40	200	4.45	10.95***	(24.94)
Color	4245	1.07	4045	32.36	200	13.54	18.82***	(17.52)
White (1990)	4245	1.00	4045	84.92	200	91.99	-7.079***	(-7.10)
Black	4245	0.99	4045	11.47	200	6.69	4.777***	(4.82)
Asian	4245	0.06	4045	1.16	200	0.42	0.739***	(12.54)
Native American	4245	0.04	4045	0.34	200	0.46	-0.118**	(-2.96)
Others	4245	0.07	4045	1.71	200	0.45	1.255***	(18.51)
Hispanic	4245	0.33	4045	10.86	200	2.37	8.490***	(26.10)
Color	4245	1.02	4045	23.36	200	9.86	13.50***	(13.25)

*p<0.05, **p<0.01, ***p<0.001

9. Saint Lucie, Florida

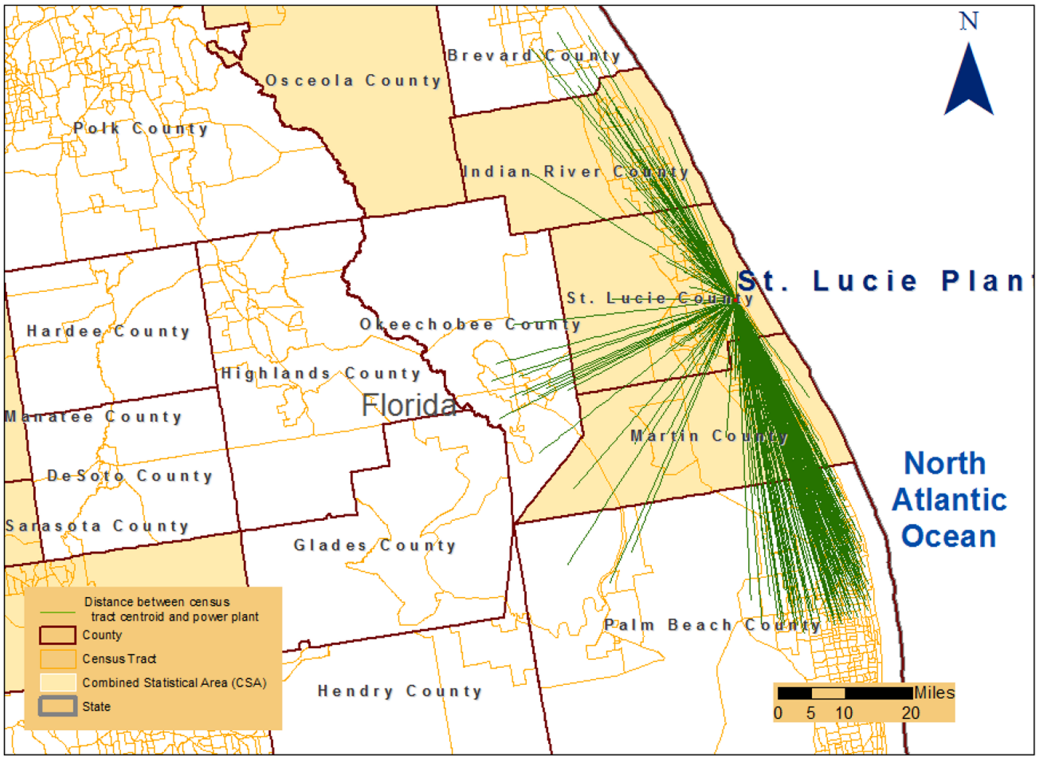

Figure B. 9 Distance to census-tract center points of census tracts within a 50-mile radius of Saint Lucie, Florida in 1990, 2000, and 2010

Table B. 17

Demographic Composition of Population, as sorted by Distance from Saint Lucie, Florida in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	35	41	34	60	96	266	3,979
Tract area (sq. mile)	234	623	759	1,130	548	3,296	62,462
Total population	132,150	108,530	102,822	126,571	262,246	732,319	12,205,582
White	111,476	96,285	90,925	118,866	195,351	612,903	10,142,813
Black	18,060	10,615	9,469	3,328	58,913	100,385	1,655,553
Asian	778	592	609	1,026	2,977	5,982	144,219
Native American	341	187	199	375	570	1,672	40,941
Others	1,489	863	1,611	2,969	4,449	11,381	222,066
Hispanic	4,855	2,983	3,965	6,965	22,856	41,624	1,513,424
Color	23,803	14,237	14,140	11,732	83,969	147,881	3,301,312
White (%)	84.36	88.72	88.43	93.91	74.49	83.69	83.10
Black (%)	13.67	9.78	9.21	2.63	22.46	13.71	13.56
Asian (%)	0.59	0.55	0.59	0.81	1.14	0.82	1.18
Native American (%)	0.26	0.17	0.19	0.30	0.22	0.23	0.34
Others (%)	1.13	0.80	1.57	2.35	1.70	1.55	1.82
Hispanic (%)	3.67	2.75	3.86	5.50	8.72	5.68	12.40
Color (%)	18.01	13.12	13.75	9.27	32.02	20.19	27.05
Female (%)	51.67	51.51	50.47	50.73	51.49	51.25	51.68
Elderly (65 + years) (%)	23.04	25.28	23.59	18.57	18.34	20.99	18.15
Kid (< 5 years) (%)	7.97	6.90	6.74	7.70	8.78	7.88	7.81
Native-born (%)	93.06	94.66	93.80	93.37	87.41	91.43	86.89
Renter housing units (%)	22.10	18.62	18.89	20.20	28.65	23.07	27.86
Education (%)	14.27	18.77	21.85	21.99	18.07	18.71	18.25
Unemployment (%)	7.20	5.33	5.39	4.08	6.04	5.70	5.79
Poverty (%)	12.32	8.99	9.02	9.14	12.41	10.85	12.80
Mean household income ($)	57,422	73,203	76,239	73,685	66,000	68,322	59,432
Year 2000							
Total population	157,349	147,427	124,539	179,907	321,611	930,833	15,051,545
White	126,970	128,081	109,638	160,956	213,372	739,017	11,724,285
Black	21,221	13,421	8,984	6,928	80,707	131,261	2,180,844
Asian	1,436	1,157	921	2,703	5,504	11,721	259,468
Native American	413	451	330	366	1,040	2,600	51,828
Others	7,302	4,331	4,653	8,921	21,014	46,221	835,133
Hispanic	13,508	8,159	8,239	18,018	47,076	95,000	2,585,314
Color	38,521	24,559	19,342	29,831	139,481	251,734	5,274,186
White (%)	80.69	86.88	88.04	89.47	66.34	79.39	77.89
Black (%)	13.49	9.10	7.21	3.85	25.09	14.10	14.49
Asian (%)	0.91	0.78	0.74	1.50	1.71	1.26	1.72
Native American (%)	0.26	0.31	0.26	0.20	0.32	0.28	0.34
Others (%)	4.64	2.94	3.74	4.96	6.53	4.97	5.55
Hispanic (%)	8.58	5.53	6.62	10.02	14.64	10.21	17.18
Color (%)	24.48	16.66	15.53	16.58	43.37	27.04	35.04
Female (%)	51.60	51.43	50.26	50.28	51.34	51.05	51.29
Elderly (65 + years) (%)	23.15	27.36	25.16	19.70	16.24	21.03	17.34
Kid (< 5 years) (%)	6.64	5.49	5.97	6.46	7.47	6.62	7.14
Native-born (%)	89.03	92.79	91.97	89.39	82.09	87.69	83.02
Renter housing units (%)	20.50	15.67	17.77	16.61	28.75	21.27	26.27
College degree or higher (%)	16.22	22.95	27.15	26.87	21.50	22.69	22.31
Unemployment (%)	5.39	3.97	4.32	3.63	5.56	4.74	5.62
Poverty (%)	14.10	8.69	8.10	7.93	14.10	11.25	12.59
Mean household income ($)	58,800	77,356	84,862	88,879	71,357	75,463	66,100
Year 2010							
Total population	206,961	186,605	144,462	232,232	380,764	1,151,024	17,360,596
White	157,045	151,285	127,353	204,978	240,086	880,747	13,234,481
Black	34,488	23,619	10,053	11,994	104,682	184,836	2,715,576
Asian	3,400	2,543	1,409	4,697	8,452	20,501	434,880
Native American	1,268	736	383	608	1,078	4,073	50,497
Others	10,760	8,422	5,264	9,955	26,466	60,867	925,162
Hispanic	31,454	22,129	15,235	32,462	78,316	179,596	3,815,728
Color	71,721	51,118	28,928	51,951	196,294	400,012	7,179,352
White (%)	75.88	81.07	88.16	88.26	63.05	76.52	76.23

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	16.66	12.66	6.96	5.16	27.49	16.06	15.64
Asian (%)	1.64	1.36	0.98	2.02	2.22	1.78	2.50
Native American (%)	0.61	0.39	0.27	0.26	0.28	0.35	0.29
Others (%)	5.20	4.51	3.64	4.29	6.95	5.29	5.33
Hispanic (%)	15.20	11.86	10.55	13.98	20.57	15.60	21.98
Color (%)	34.65	27.39	20.02	22.37	51.55	34.75	41.35
Female (%)	51.10	50.48	52.08	50.58	51.37	51.11	51.11
Elderly (65 + years) (%)	21.43	22.60	24.35	21.65	15.33	20.01	16.73
Kid (< 5 years) (%)	6.02	5.11	4.83	5.08	6.07	5.55	5.86
Native-born (%)	84.74	87.78	90.01	86.13	76.52	83.46	80.65
Renter housing units (%)	20.81	14.73	16.85	16.92	25.91	20.05	24.75
College degree or higher (%)	18.16	26.19	29.63	33.01	24.66	26.14	25.89
Unemployment (%)	11.90	10.29	9.08	7.97	9.69	9.74	8.83
Poverty (%)	14.10	10.29	11.94	9.36	15.67	12.77	13.89
Mean household income ($)	56,660	76,319	81,158	95,132	69,089	75,053	65,733
Index	9	9	9	9	9	9	9

Table B. 18

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Saint Lucie, Florida

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	4245	1.73	3979	76.08	266	74.53	1.549	(0.90)
Black	4245	1.40	3979	14.92	266	14.97	-0.0478	(-0.03)
Asian	4245	0.13	3979	2.24	266	1.58	0.664***	(5.30)
Native American	4245	0.06	3979	0.29	266	0.34	-0.0462	(-0.81)
Others	4245	0.32	3979	4.84	266	4.46	0.383	(1.21)
Hispanic	4245	0.91	3979	19.65	266	13.51	6.140***	(6.72)
Color	4245	1.71	3979	38.00	266	31.12	6.876***	(4.03)
White (2000)	4245	1.52	3979	79.30	266	80.68	-1.375	(-0.90)
Black	4245	1.41	3979	13.46	266	13.08	0.389	(0.28)
Asian	4245	0.14	3979	1.63	266	1.39	0.245	(1.77)
Native American	4245	0.04	3979	0.35	266	0.30	0.05	(1.24)
Others	4245	0.33	3979	5.15	266	4.53	0.612	(1.87)
Hispanic	4245	0.74	3979	15.26	266	9.23	6.032***	(8.20)
Color	4245	1.65	3979	31.90	266	25.10	6.794***	(4.12)
White (1990)	4245	1.56	3979	85.22	266	85.63	-0.402	(-0.26)
Black	4245	1.41	3979	11.27	266	10.89	0.375	(0.27)
Asian	4245	0.07	3979	1.15	266	0.71	0.437***	(6.41)
Native American	4245	0.02	3979	0.36	266	0.21	0.155***	(6.37)
Others	4245	0.22	3979	1.66	266	1.39	0.273	(1.22)
Hispanic	4245	0.51	3979	10.81	266	5.27	5.542***	(10.90)
Color	4245	1.50	3979	23.11	266	16.94	6.172***	(4.13)

*p<0.05, **p<0.01, ***p<0.001

10. Turkey Point Nuclear Generating, Florida

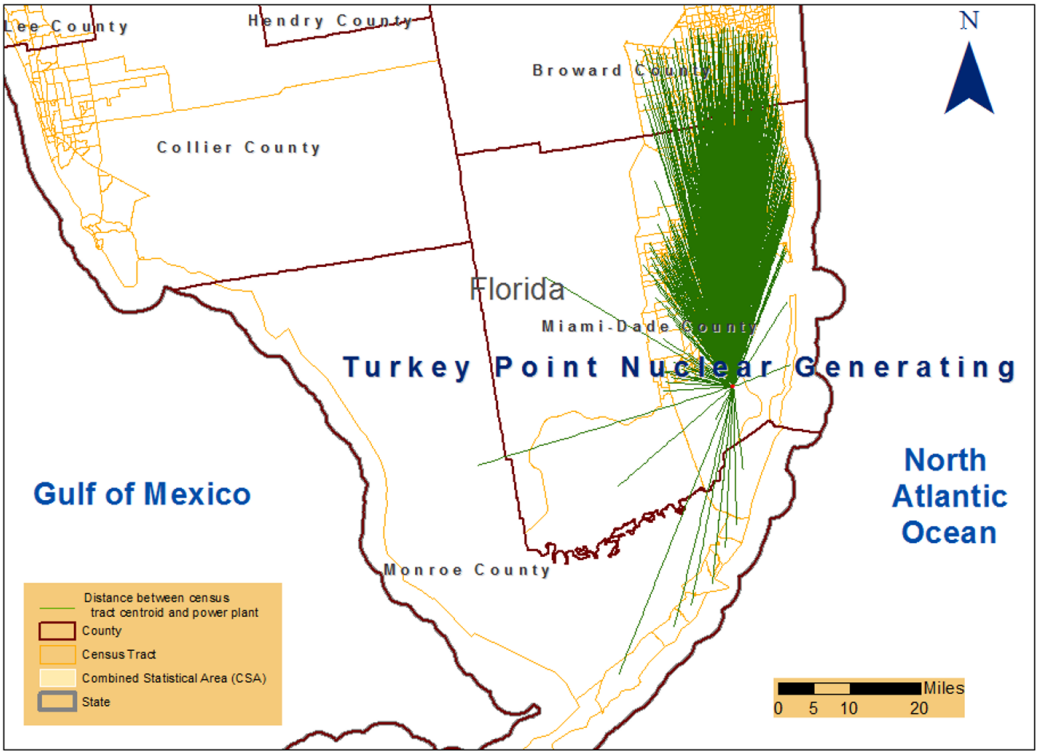

Figure B. 10 Distance to census-tract center points of census tracts within a 50-mile radius of Turkey Point Nuclear Generating, Florida in 1990, 2000, and 2010

Table B. 19

Demographic Composition of Population, as sorted by Distance from Turkey Point Nuclear Generating, Florida in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	26	97	236	193	139	691	3,554
Tract area (sq. mile)	208	599	588	2,794	242	4,431	61,326
Total population	89,348	362,555	847,153	721,636	468,445	2,489,137	10,448,764
White	58,339	294,607	658,329	475,188	389,620	1,876,083	8,879,633
Black	22,707	46,829	129,598	208,634	64,701	472,469	1,283,469
Asian	1,251	9,012	6,571	9,146	6,461	32,441	117,760
Native American	355	552	976	1,185	1,397	4,465	38,148
Others	6,704	11,544	51,705	27,477	6,252	103,682	129,765
Hispanic	27,217	127,347	557,806	249,329	48,145	1,009,844	545,204
Color	50,859	181,670	681,481	457,442	118,755	1,490,207	1,958,986
White (%)	65.29	81.26	77.71	65.85	83.17	75.37	84.98
Black (%)	25.41	12.92	15.30	28.91	13.81	18.98	12.28
Asian (%)	1.40	2.49	0.78	1.27	1.38	1.30	1.13
Native American (%)	0.40	0.15	0.12	0.16	0.30	0.18	0.37
Others (%)	7.50	3.18	6.10	3.81	1.33	4.17	1.24
Hispanic (%)	30.46	35.12	65.84	34.55	10.28	40.57	5.22
Color (%)	56.92	50.11	80.44	63.39	25.35	59.87	18.75
Female (%)	50.02	51.65	52.05	52.91	51.65	52.09	51.55
Elderly (65 + years) (%)	9.31	8.66	16.14	15.00	16.87	14.61	19.19
Kid (< 5 years) (%)	11.87	9.21	7.83	8.71	7.59	8.38	7.68
Native-born (%)	81.77	69.11	42.53	62.01	84.47	61.35	93.29
Renter housing units (%)	39.97	29.04	49.39	34.49	27.42	37.28	25.58
Education (%)	10.72	31.65	16.61	15.57	18.96	18.70	18.18
Unemployment (%)	7.53	4.86	8.65	7.70	5.49	7.14	5.43
Poverty (%)	21.95	8.97	22.76	15.35	10.76	16.29	11.83
Mean household income ($)	49,888	88,232	54,126	60,719	66,146	63,151	59,246
Year 2000							
Total population	99,529	461,953	920,354	913,887	628,598	3,024,321	12,958,057
White	55,125	356,258	722,966	520,497	476,049	2,130,895	10,332,407
Black	30,816	55,493	110,717	297,104	96,481	590,611	1,721,494
Asian	1,187	11,351	8,006	14,613	15,638	50,795	220,394
Native American	137	1,389	1,634	1,984	1,976	7,120	47,308
Others	12,273	37,454	77,017	79,689	38,437	244,870	636,484
Hispanic	45,524	240,853	651,320	391,989	128,148	1,457,834	1,222,480
Color	78,747	313,670	767,526	715,076	253,323	2,128,342	3,397,578
White (%)	55.39	77.12	78.55	56.95	75.73	70.46	79.74
Black (%)	30.96	12.01	12.03	32.51	15.35	19.53	13.29
Asian (%)	1.19	2.46	0.87	1.60	2.49	1.68	1.70
Native American (%)	0.14	0.30	0.18	0.22	0.31	0.24	0.37
Others (%)	12.33	8.11	8.37	8.72	6.11	8.10	4.91
Hispanic (%)	45.74	52.14	70.77	42.89	20.39	48.20	9.43
Color (%)	79.12	67.90	83.39	78.25	40.30	70.37	26.22
Female (%)	51.22	52.03	51.17	52.50	51.25	51.72	51.17
Elderly (65 + years) (%)	7.75	9.56	16.27	13.10	12.56	13.24	18.57
Kid (< 5 years) (%)	11.47	8.43	6.78	8.26	7.69	7.82	6.94
Native-born (%)	69.49	58.29	40.41	53.52	75.88	55.43	89.79
Renter housing units (%)	44.55	26.43	46.13	31.96	27.29	34.79	24.25
College degree or higher (%)	11.72	31.26	21.02	18.61	27.13	22.86	22.22
Unemployment (%)	11.41	6.04	9.08	9.18	4.78	7.70	5.07
Poverty (%)	27.84	10.58	20.36	16.83	10.52	15.98	11.70
Mean household income ($)	47,347	88,385	60,468	62,458	76,392	68,310	66,321
Year 2010							
Total population	147,705	491,195	1,006,372	987,234	686,042	3,318,548	15,193,072
White	97,921	395,950	828,717	568,334	487,871	2,378,793	11,736,435
Black	37,054	52,053	117,434	329,001	123,671	659,213	2,241,199
Asian	2,897	12,580	13,448	19,416	23,470	71,811	383,570
Native American	143	647	1,228	1,819	1,648	5,485	49,085
Others	9,690	29,965	45,545	68,664	49,382	203,246	782,783
Hispanic	82,831	307,830	755,234	484,952	199,051	1,829,898	2,165,426
Color	122,889	375,537	873,067	826,040	356,808	2,554,341	5,025,023
White (%)	66.29	80.61	82.35	57.57	71.11	71.68	77.25

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	25.09	10.60	11.67	33.33	18.03	19.86	14.75
Asian (%)	1.96	2.56	1.34	1.97	3.42	2.16	2.52
Native American (%)	0.10	0.13	0.12	0.18	0.24	0.17	0.32
Others (%)	6.56	6.10	4.53	6.96	7.20	6.12	5.15
Hispanic (%)	56.08	62.67	75.05	49.12	29.01	55.14	14.25
Color (%)	83.20	76.45	86.75	83.67	52.01	76.97	33.07
Female (%)	52.12	52.53	50.21	52.89	50.95	51.59	51.01
Elderly (65 + years) (%)	7.30	11.99	15.89	13.55	12.28	13.49	17.68
Kid (< 5 years) (%)	10.02	6.00	5.59	6.48	5.87	6.17	5.76
Native-born (%)	65.01	56.35	41.90	52.40	69.62	53.92	86.70
Renter housing units (%)	40.03	25.16	41.58	29.91	25.89	32.38	22.99
College degree or higher (%)	17.99	34.25	26.39	23.91	32.65	27.77	25.51
Unemployment (%)	9.68	7.72	7.88	9.43	8.03	8.42	8.99
Poverty (%)	24.41	11.06	19.12	15.67	11.01	15.43	13.47
Mean household income ($)	52,294	86,037	60,694	61,531	79,165	68,233	65,956
Index	10	10	10	10	10	10	10

Table B. 20

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Turkey Point Nuclear Generating, Florida

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	4245	1.12	3554	76.78	691	71.88	4.899***	(4.39)
Black	4245	1.05	3554	14.19	691	18.66	-4.464***	(-4.26)
Asian	4245	0.12	3554	2.23	691	2.05	0.18	(1.56)
Native American	4245	0.02	3554	0.32	691	0.16	0.163***	(6.78)
Others	4245	0.20	3554	4.60	691	5.96	-1.360***	(-6.84)
Hispanic	4245	1.15	3554	12.75	691	52.77	-40.02***	(-34.78)
Color	4245	1.04	3554	30.62	691	73.33	-42.71***	(-40.97)
White (2000)	4245	1.10	3554	80.99	691	71.14	9.846***	(8.94)
Black	4245	1.05	3554	12.44	691	18.57	-6.127***	(-5.83)
Asian	4245	0.09	3554	1.60	691	1.71	-0.114	(-1.21)
Native American	4245	0.02	3554	0.36	691	0.24	0.125***	(5.47)
Others	4245	0.21	3554	4.59	691	7.77	-3.182***	(-14.97)
Hispanic	4245	1.13	3554	8.78	691	46.30	-37.52***	(-33.26)
Color	4245	1.10	3554	24.54	691	67.15	-42.61***	(-38.83)
White (1990)	4245	1.09	3554	86.83	691	77.12	9.705***	(8.92)
Black	4245	1.03	3554	10.33	691	15.96	-5.637***	(-5.45)
Asian	4245	0.11	3554	1.07	691	1.42	-0.356***	(-3.34)
Native American	4245	0.05	3554	0.37	691	0.23	0.149**	(2.80)
Others	4245	0.17	3554	1.20	691	3.95	-2.753***	(-16.24)
Hispanic	4245	1.17	3554	5.10	691	38.04	-32.94***	(-28.24)
Color	4245	1.25	3554	16.59	691	54.31	-37.72***	(-30.19)

*p<0.05, **p<0.01, ***p<0.001

11. Edwin I. Hatch Nuclear Plant, Georgia

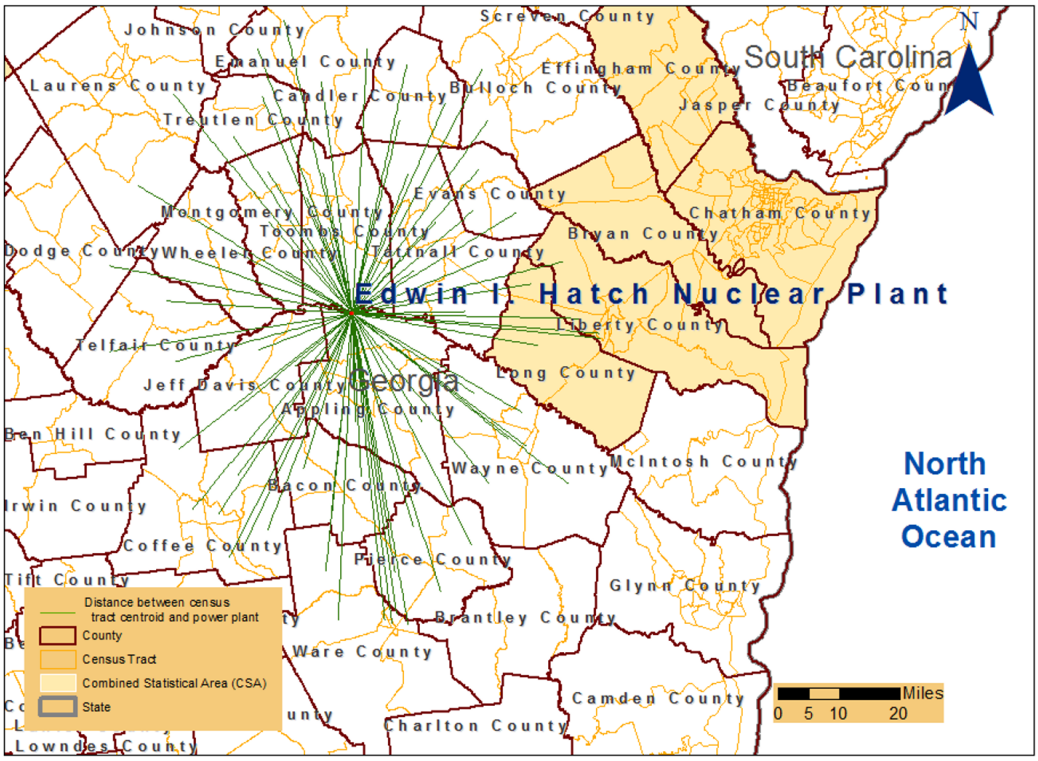

Figure B. 11 Distance to census-tract center points of census tracts within a 50-mile radius of Edwin I. Hatch Nuclear Plant, Georgia in 1990, 2000, and 2010

Table B. 21

Demographic Composition of Population, as sorted by Distance from Edwin I. Hatch Nuclear Plant, Georgia in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	3	10	16	23	20	72	1,897
Tract area (sq. mile)	333	842	1,516	2,060	1,835	6,586	52,839
Total population	9,459	39,605	45,207	82,460	67,051	243,782	6,234,427
White	6,608	31,273	33,461	57,591	50,374	179,307	4,424,063
Black	2,595	7,488	11,279	23,146	16,157	60,665	1,684,207
Asian	1	64	76	534	269	944	72,812
Native American	22	118	39	186	104	469	14,813
Others	237	663	344	1,000	158	2,402	38,495
Hispanic	264	861	592	1,839	400	3,956	97,435
Color	2,878	8,518	11,952	25,591	16,887	65,826	1,862,637
White (%)	69.86	78.96	74.02	69.84	75.13	73.55	70.96
Black (%)	27.43	18.91	24.95	28.07	24.10	24.88	27.01
Asian (%)	0.01	0.16	0.17	0.65	0.40	0.39	1.17
Native American (%)	0.23	0.30	0.09	0.23	0.16	0.19	0.24
Others (%)	2.51	1.67	0.76	1.21	0.24	0.99	0.62
Hispanic (%)	2.79	2.17	1.31	2.23	0.60	1.62	1.56
Color (%)	30.43	21.51	26.44	31.03	25.19	27.00	29.88
Female (%)	50.66	49.44	52.17	49.57	52.49	50.88	51.53
Elderly (65 + years) (%)	10.97	11.30	14.20	11.14	12.04	11.97	10.00
Kid (< 5 years) (%)	8.30	8.55	8.45	10.10	9.61	9.34	9.14
Native-born (%)	99.03	98.79	99.09	98.74	99.33	98.99	97.26
Renter housing units (%)	18.48	27.00	25.12	29.62	25.02	26.56	31.63
Education (%)	5.79	9.11	9.54	9.41	10.07	9.43	19.69
Unemployment (%)	6.68	5.76	5.61	6.23	6.29	6.06	5.73
Poverty (%)	22.77	19.83	23.72	23.56	20.18	22.01	14.37
Mean household income ($)	40,800	43,952	44,102	41,438	44,229	43,121	61,069
Year 2000							
Total population	10,524	45,652	51,136	96,476	80,828	284,616	7,901,837
White	7,454	33,027	35,664	63,657	55,714	195,516	5,131,659
Black	2,465	9,230	13,406	27,346	21,630	74,077	2,268,033
Asian	11	309	184	699	562	1,765	173,564
Native American	0	93	187	304	140	724	22,964
Others	597	3,002	1,676	4,475	2,795	12,545	305,606
Hispanic	663	3,992	1,886	5,908	2,838	15,287	414,689
Color	3,180	13,770	15,976	34,963	25,865	93,754	2,962,972
White (%)	70.83	72.35	69.74	65.98	68.93	68.69	64.94
Black (%)	23.42	20.22	26.22	28.34	26.76	26.03	28.70
Asian (%)	0.10	0.68	0.36	0.72	0.70	0.62	2.20
Native American (%)	0.00	0.20	0.37	0.32	0.17	0.25	0.29
Others (%)	5.67	6.58	3.28	4.64	3.46	4.41	3.87
Hispanic (%)	6.30	8.74	3.69	6.12	3.51	5.37	5.25
Color (%)	30.22	30.16	31.24	36.24	32.00	32.94	37.50
Female (%)	51.16	47.95	49.12	48.13	51.01	49.21	50.93
Elderly (65 + years) (%)	11.16	10.79	12.87	10.12	11.62	11.19	9.57
Kid (< 5 years) (%)	9.13	8.62	8.41	9.21	8.88	8.87	8.67
Native-born (%)	95.43	94.26	96.90	95.88	97.12	96.14	92.83
Renter housing units (%)	14.63	24.77	22.43	26.20	23.22	23.93	29.99
College degree or higher (%)	6.42	9.63	11.15	9.58	12.31	10.54	24.78
Unemployment (%)	6.58	5.31	5.34	6.70	5.61	5.89	5.48
Poverty (%)	21.69	21.75	21.48	20.52	19.46	20.61	12.72
Mean household income ($)	46,407	46,599	48,493	47,793	49,401	48,147	71,311
Year 2010							
Total population	10,422	47,478	57,197	98,638	90,482	304,217	9,164,598
White	7,395	33,734	39,614	66,518	59,717	206,978	5,581,277
Black	2,449	8,986	16,033	26,473	25,290	79,231	2,793,838
Asian	0	367	412	241	718	1,738	300,098
Native American	0	248	50	233	137	668	22,566
Others	578	4,143	1,088	5,173	4,620	15,602	466,819
Hispanic	640	6,562	2,146	8,851	5,475	23,674	761,038
Color	3,200	16,518	18,791	36,632	32,836	107,977	3,979,068
White (%)	70.96	71.05	69.26	67.44	66.00	68.04	60.90

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	23.50	18.93	28.03	26.84	27.95	26.04	30.49
Asian (%)	0.00	0.77	0.72	0.24	0.79	0.57	3.27
Native American (%)	0.00	0.52	0.09	0.24	0.15	0.22	0.25
Others (%)	5.55	8.73	1.90	5.24	5.11	5.13	5.09
Hispanic (%)	6.14	13.82	3.75	8.97	6.05	7.78	8.30
Color (%)	30.70	34.79	32.85	37.14	36.29	35.49	43.42
Female (%)	53.03	47.99	47.84	48.12	49.98	48.77	51.21
Elderly (65 + years) (%)	13.83	11.57	13.40	11.54	12.48	12.25	10.19
Kid (< 5 years) (%)	6.77	7.90	6.41	7.29	6.84	7.07	7.28
Native-born (%)	96.78	91.37	96.89	93.65	96.39	94.83	90.25
Renter housing units (%)	19.33	28.34	24.96	28.84	25.42	26.63	28.33
College degree or higher (%)	8.15	10.66	13.69	10.42	12.00	11.48	27.74
Unemployment (%)	6.08	6.01	5.88	8.09	7.58	7.12	8.90
Poverty (%)	24.15	23.90	20.96	21.13	19.39	21.12	15.53
Mean household income ($)	42,325	44,850	48,634	43,926	49,169	46,491	67,268
Index	11	11	11	11	11	11	11

Table B. 22

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Edwin I. Hatch Nuclear Plant, Georgia

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	1969	2.07	1897	59.37	72	69.71	-10.34***	(-4.99)
Black	1969	1.82	1897	32.05	72	23.18	8.870***	(4.87)
Asian	1969	0.16	1897	2.94	72	0.56	2.377***	(15.27)
Native American	1969	0.06	1897	0.26	72	0.22	0.031	(0.50)
Others	1969	0.65	1897	4.76	72	4.94	-0.185	(-0.29)
Hispanic	1969	0.88	1897	7.76	72	7.33	0.43	(0.49)
Color	1969	1.94	1897	44.05	72	32.14	11.90***	(6.13)
White (2000)	1969	1.78	1897	64.55	72	70.87	-6.316***	(-3.55)
Black	1969	1.68	1897	29.48	72	24.05	5.435**	(3.24)
Asian	1969	0.12	1897	2.02	72	0.54	1.478***	(12.81)
Native American	1969	0.05	1897	0.30	72	0.24	0.063	(1.35)
Others	1969	0.44	1897	3.65	72	4.31	-0.662	(-1.51)
Hispanic	1969	0.59	1897	4.91	72	5.39	-0.476	(-0.80)
Color	1969	1.81	1897	37.66	72	30.80	6.859***	(3.80)
White (1990)	1969	1.63	1897	72.82	72	75.12	-2.306	(-1.41)
Black	1969	1.59	1897	25.23	72	23.47	1.759	(1.10)
Asian	1969	0.09	1897	1.09	72	0.31	0.780***	(8.63)
Native American	1969	0.03	1897	0.25	72	0.16	0.0889**	(3.05)
Others	1969	0.19	1897	0.60	72	0.94	-0.335	(-1.73)
Hispanic	1969	0.27	1897	1.54	72	1.60	-0.063	(-0.23)
Color	1969	1.65	1897	28.02	72	25.48	2.542	(1.54)

*p<0.05, **p<0.01, ***p<0.001

12. Vogtle Electric Generating Plant, Georgia

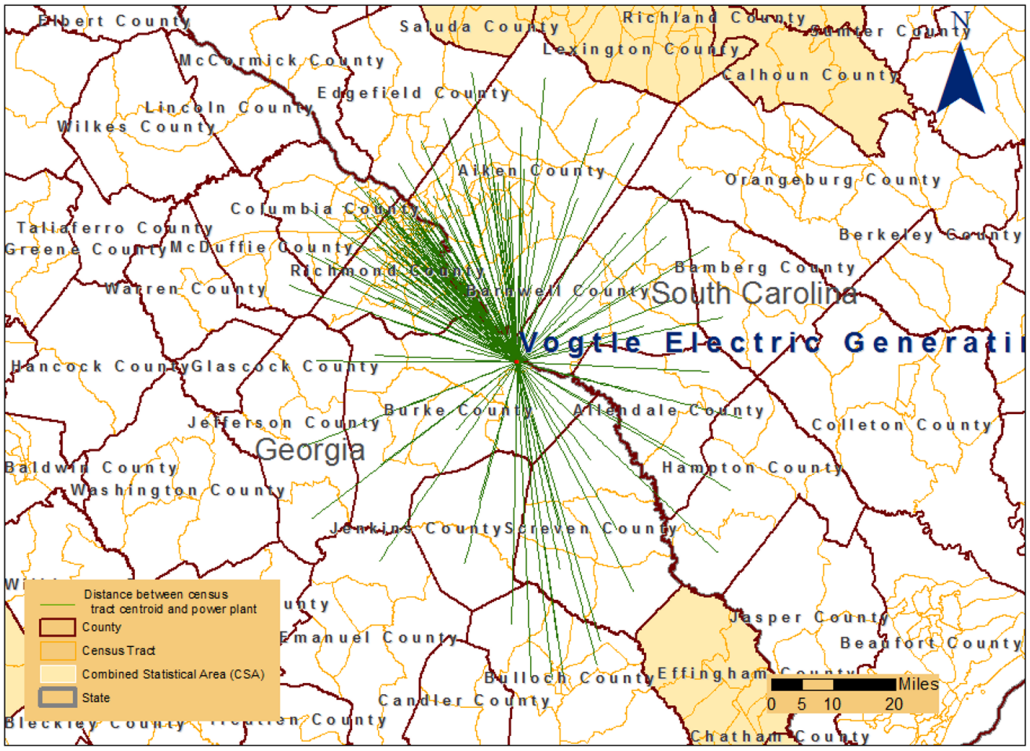

Figure B. 12 Distance to census-tract center points of census tracts within a 50-mile radius of Vogtle Electric Generating Plant, Georgia in 1990, 2000, and 2010

Table B. 23

Demographic Composition of Population, as sorted by Distance from Vogtle Electric Generating Plant, Georgia in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	2	11	62	50	14	139	2,933
Tract area (sq. mile)	325	1,146	1,365	1,978	1,434	6,248	85,198
Total population	6,629	36,043	245,643	180,329	49,337	517,981	9,446,914
White	3,583	21,485	141,389	129,742	25,072	321,271	6,689,779
Black	3,009	14,313	98,548	47,408	24,121	187,399	2,597,474
Asian	0	67	3,180	2,481	31	5,759	89,294
Native American	6	102	679	311	64	1,162	23,053
Others	31	78	1,846	378	49	2,382	47,291
Hispanic	38	189	3,876	1,738	160	6,001	123,720
Color	3,055	14,671	105,948	51,775	24,350	199,799	2,823,437
White (%)	54.05	59.61	57.56	71.95	50.82	62.02	70.81
Black (%)	45.39	39.71	40.12	26.29	48.89	36.18	27.50
Asian (%)	0.00	0.19	1.29	1.38	0.06	1.11	0.95
Native American (%)	0.09	0.28	0.28	0.17	0.13	0.22	0.24
Others (%)	0.47	0.22	0.75	0.21	0.10	0.46	0.50
Hispanic (%)	0.57	0.52	1.58	0.96	0.32	1.16	1.31
Color (%)	46.09	40.70	43.13	28.71	49.35	38.57	29.89
Female (%)	50.20	52.51	51.69	51.40	52.07	51.66	51.55
Elderly (65 + years) (%)	9.49	10.47	10.83	9.45	12.38	10.46	10.53
Kid (< 5 years) (%)	10.42	10.18	9.57	9.50	9.90	9.63	8.99
Native-born (%)	99.70	99.31	97.74	97.82	99.70	98.09	97.74
Renter housing units (%)	16.76	22.45	34.44	24.41	23.61	28.97	29.80
Education (%)	5.62	10.53	15.24	20.52	9.46	16.11	18.50
Unemployment (%)	7.39	7.50	6.87	5.24	6.36	6.27	5.65
Poverty (%)	28.92	20.85	18.86	13.99	25.33	18.06	14.73
Mean household income ($)	40,703	48,701	49,739	62,449	41,184	53,117	58,054
Year 2000							
Total population	7,929	43,024	264,222	213,861	58,281	587,317	11,611,148
White	4,311	24,830	134,664	148,505	30,561	342,871	7,679,982
Black	3,560	17,122	118,375	56,432	26,662	222,151	3,302,686
Asian	6	181	3,122	4,016	187	7,512	205,706
Native American	0	158	801	731	208	1,898	36,478
Others	52	739	7,256	4,171	660	12,878	386,303
Hispanic	110	981	7,174	3,824	1,062	13,151	509,653
Color	3,672	18,751	132,525	67,414	28,316	250,678	4,163,659
White (%)	54.37	57.71	50.97	69.44	52.44	58.38	66.14
Black (%)	44.90	39.80	44.80	26.39	45.75	37.82	28.44
Asian (%)	0.08	0.42	1.18	1.88	0.32	1.28	1.77
Native American (%)	0.00	0.37	0.30	0.34	0.36	0.32	0.31
Others (%)	0.66	1.72	2.75	1.95	1.13	2.19	3.33
Hispanic (%)	1.39	2.28	2.72	1.79	1.82	2.24	4.39
Color (%)	46.31	43.58	50.16	31.52	48.59	42.68	35.86
Female (%)	50.36	51.92	51.68	51.93	50.09	51.61	51.03
Elderly (65 + years) (%)	9.04	10.19	11.73	10.90	11.39	11.25	10.40
Kid (< 5 years) (%)	9.71	8.58	8.48	8.21	8.17	8.38	8.42
Native-born (%)	98.85	98.34	97.26	96.63	98.79	97.28	94.17
Renter housing units (%)	12.79	20.15	32.67	22.13	20.30	26.51	27.94
College degree or higher (%)	8.41	11.69	17.57	24.76	11.72	19.12	23.20
Unemployment (%)	7.42	7.49	8.58	5.76	7.12	7.26	5.53
Poverty (%)	21.22	20.93	19.47	12.25	20.27	17.03	13.17
Mean household income ($)	45,999	51,797	54,547	66,926	49,348	58,262	67,495
Year 2010							
Total population	8,333	41,084	272,766	243,472	62,698	628,353	13,351,890
White	4,383	23,614	130,725	166,074	34,830	359,626	8,462,629
Black	3,870	16,067	128,319	64,543	25,438	238,237	3,904,316
Asian	0	154	4,007	5,517	677	10,355	347,822
Native American	0	184	656	246	193	1,279	36,050
Others	80	1,065	9,059	7,092	1,560	18,856	601,073
Hispanic	117	589	11,525	9,143	2,062	23,436	970,030

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Color	4,067	17,758	147,781	82,823	28,865	281,294	5,409,504
White (%)	52.60	57.48	47.93	68.21	55.55	57.23	63.38
Black (%)	46.44	39.11	47.04	26.51	40.57	37.91	29.24
Asian (%)	0.00	0.37	1.47	2.27	1.08	1.65	2.61
Native American (%)	0.00	0.45	0.24	0.10	0.31	0.20	0.27
Others (%)	0.96	2.59	3.32	2.91	2.49	3.00	4.50
Hispanic (%)	1.40	1.43	4.23	3.76	3.29	3.73	7.27
Color (%)	48.81	43.22	54.18	34.02	46.04	44.77	40.51
Female (%)	52.78	51.17	51.63	51.57	48.99	51.33	51.19
Elderly (65 + years) (%)	10.15	10.66	12.48	12.50	11.11	12.20	11.16
Kid (< 5 years) (%)	8.29	6.67	6.84	6.97	6.64	6.88	7.05
Native-born (%)	99.11	98.49	96.42	95.56	96.51	96.27	91.78
Renter housing units (%)	15.25	23.31	32.10	22.09	21.49	26.46	27.23
College degree or higher (%)	6.42	14.91	20.08	26.87	15.81	21.84	26.34
Unemployment (%)	11.84	9.94	10.55	7.65	10.52	9.35	8.96
Poverty (%)	28.36	22.54	21.82	14.06	21.54	18.90	15.79
Mean household income ($)	44,522	50,799	51,582	66,663	49,153	57,078	64,378
Index	12	12	12	12	12	12	12

Table B. 24

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Vogtle Electric Generating Plant, Georgia

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	3072	2.18	2933	62.20	139	55.03	-10.34***	(-4.99)
Black	3072	2.21	2933	30.24	139	39.20	8.870***	(4.87)
Asian	3072	0.23	2933	2.29	139	1.41	2.377***	(15.27)
Native American	3072	0.04	2933	0.27	139	0.20	0.031	(0.50)
Others	3072	0.24	2933	4.13	139	2.71	-0.185	(-0.29)
Hispanic	3072	0.35	2933	6.69	139	3.48	0.43	(0.49)
Color	3072	2.13	2933	40.57	139	45.44	11.90***	(6.13)
White (2000)	3072	2.08	2933	66.17	139	58.02	-6.316***	(-3.55)
Black	3072	2.15	2933	28.77	139	38.39	5.435**	(3.24)
Asian	3072	0.15	2933	1.62	139	1.20	1.478***	(12.81)
Native American	3072	0.04	2933	0.33	139	0.34	0.063	(1.35)
Others	3072	0.16	2933	3.13	139	2.06	-0.662	(-1.51)
Hispanic	3072	0.20	2933	4.08	139	2.13	-0.476	(-0.80)
Color	3072	2.07	2933	35.65	139	43.01	6.859***	(3.80)
White (1990)	3072	2.07	2933	72.58	139	63.50	-2.306	(-1.41)
Black	3072	2.10	2933	25.65	139	34.81	1.759	(1.10)
Asian	3072	0.13	2933	0.89	139	1.03	0.780***	(8.63)
Native American	3072	0.03	2933	0.25	139	0.23	0.0889**	(3.05)
Others	3072	0.07	2933	0.49	139	0.43	-0.335	(-1.73)
Hispanic	3072	0.12	2933	1.29	139	1.11	-0.063	(-0.23)
Color	3072	2.06	2933	27.98	139	37.09	2.542	(1.54)

*p<0.05, **p<0.01, ***p<0.001

13. Braidwood Station, Illinois

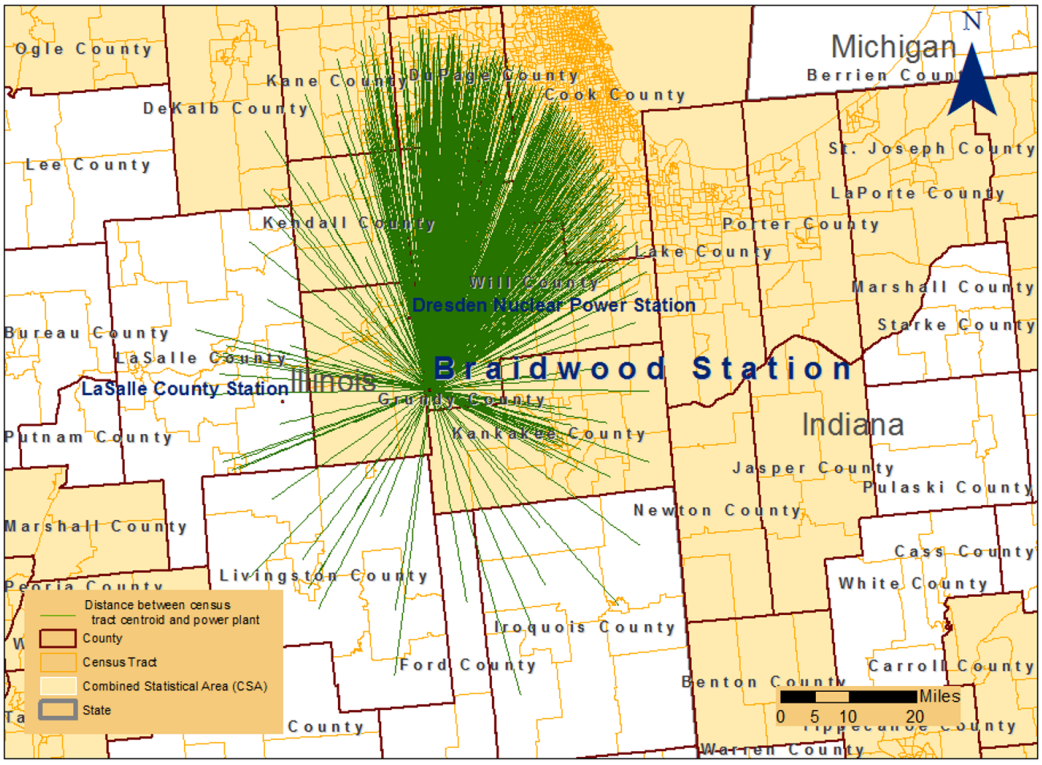

Figure B. 13 Distance to census-tract center points of census tracts within a 50-mile radius of Braidwood Station, Illinois in 1990, 2000, and 2010

Table B. 25

Demographic Composition of Population, as sorted by Distance from Braidwood Station, Illinois in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	10	35	115	248	252	660	2,463
Tract area (sq. mile)	327	1,083	1,322	2,181	893	5,806	52,108
Total population	28,159	103,904	298,603	927,921	1,008,609	2,367,196	9,063,387
White	27,795	97,315	246,012	756,921	917,354	2,045,397	6,912,516
Black	68	4,658	41,091	122,487	50,272	218,576	1,472,281
Asian	80	650	2,059	20,754	24,501	48,044	236,884
Native American	124	198	631	1,498	1,558	4,009	20,059
Others	92	1,077	8,820	26,250	14,923	51,162	421,643
Hispanic	323	2,281	16,004	53,399	42,049	114,056	764,632
Color	580	7,725	59,335	196,653	117,630	381,923	2,477,934
White (%)	98.71	93.66	82.39	81.57	90.95	86.41	76.27
Black (%)	0.24	4.48	13.76	13.20	4.98	9.23	16.24
Asian (%)	0.28	0.63	0.69	2.24	2.43	2.03	2.61
Native American (%)	0.44	0.19	0.21	0.16	0.15	0.17	0.22
Others (%)	0.33	1.04	2.95	2.83	1.48	2.16	4.65
Hispanic (%)	1.15	2.20	5.36	5.75	4.17	4.82	8.44
Color (%)	2.06	7.43	19.87	21.19	11.66	16.13	27.34
Female (%)	49.91	51.32	50.25	51.13	51.51	51.18	51.55
Elderly (65 + years) (%)	11.27	12.20	10.90	9.67	13.35	11.52	12.82
Kid (< 5 years) (%)	9.28	8.87	9.44	9.77	8.89	9.31	8.77
Native-born (%)	98.77	98.15	96.39	94.15	92.73	94.06	91.05
Renter housing units (%)	20.53	27.60	25.39	23.40	24.13	24.12	35.58
Education (%)	7.54	14.85	14.39	23.12	27.07	23.29	20.46
Unemployment (%)	7.49	4.77	6.26	5.22	3.92	4.78	7.14
Poverty (%)	7.89	6.07	8.91	6.79	4.12	5.89	13.49
Mean household income ($)	60,876	65,366	65,609	78,615	83,354	78,358	64,316
Year 2000							
Total population	32,863	119,309	391,018	1,085,281	1,089,926	2,718,397	9,700,896
White	31,993	108,074	313,445	814,590	902,339	2,170,441	6,953,123
Black	162	6,652	50,610	164,410	89,077	310,911	1,553,708
Asian	20	767	4,769	39,221	37,641	82,418	344,833
Native American	63	224	862	2,094	2,005	5,248	25,159
Others	623	3,596	21,342	64,954	58,861	149,376	824,076
Hispanic	948	4,866	35,026	106,439	100,098	247,377	1,281,764
Color	1,436	13,623	94,633	324,334	242,765	676,791	3,319,094
White (%)	97.35	90.58	80.16	75.06	82.79	79.84	71.68
Black (%)	0.49	5.58	12.94	15.15	8.17	11.44	16.02
Asian (%)	0.06	0.64	1.22	3.61	3.45	3.03	3.55
Native American (%)	0.19	0.19	0.22	0.19	0.18	0.19	0.26
Others (%)	1.90	3.01	5.46	5.98	5.40	5.50	8.49
Hispanic (%)	2.88	4.08	8.96	9.81	9.18	9.10	13.21
Color (%)	4.37	11.42	24.20	29.88	22.27	24.90	34.21
Female (%)	50.34	50.92	49.89	51.24	51.33	51.05	51.10
Elderly (65 + years) (%)	11.02	11.59	10.31	10.35	13.04	11.48	12.23
Kid (< 5 years) (%)	8.27	7.89	9.68	9.12	8.47	8.88	8.39
Native-born (%)	98.75	97.30	94.03	90.05	88.14	90.28	86.96
Renter housing units (%)	17.68	24.15	19.96	20.33	22.74	21.40	33.20
College degree or higher (%)	10.37	18.73	19.58	29.02	32.83	28.59	25.35
Unemployment (%)	5.04	5.15	4.85	4.90	4.22	4.63	6.45
Poverty (%)	5.24	6.03	6.98	6.41	5.15	5.95	12.02
Mean household income ($)	71,905	75,332	78,226	88,157	93,188	88,091	73,612
Year 2010							
Total population	35,921	143,022	510,817	1,212,228	1,116,411	3,018,399	9,726,960
White	34,793	128,578	400,286	833,626	876,852	2,274,135	6,862,545
Black	221	9,007	62,644	203,715	106,057	381,644	1,478,661
Asian	133	1,502	9,591	61,370	48,741	121,337	453,490
Native American	67	256	492	2,249	2,031	5,095	19,634
Others	707	3,679	37,804	111,268	82,730	236,188	912,630
Hispanic	1,270	9,617	77,223	191,369	171,079	450,558	1,489,370
Color	2,096	21,427	157,319	473,862	338,307	993,011	3,549,698
White (%)	96.86	89.90	78.36	68.77	78.54	75.34	70.55

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	0.62	6.30	12.26	16.81	9.50	12.64	15.20
Asian (%)	0.37	1.05	1.88	5.06	4.37	4.02	4.66
Native American (%)	0.19	0.18	0.10	0.19	0.18	0.17	0.20
Others (%)	1.97	2.57	7.40	9.18	7.41	7.82	9.38
Hispanic (%)	3.54	6.72	15.12	15.79	15.32	14.93	15.31
Color (%)	5.84	14.98	30.80	39.09	30.30	32.90	36.49
Female (%)	49.39	50.20	50.62	51.11	51.23	51.01	50.95
Elderly (65 + years) (%)	12.54	11.31	10.36	11.08	12.62	11.56	12.54
Kid (< 5 years) (%)	6.36	6.86	7.57	6.82	6.58	6.85	6.56
Native-born (%)	98.54	96.46	90.89	86.60	85.33	87.46	86.04
Renter housing units (%)	16.45	20.16	17.21	19.41	21.69	19.93	30.13
College degree or higher (%)	11.65	22.01	24.50	32.24	37.15	32.08	29.72
Unemployment (%)	11.90	7.26	8.40	8.85	8.01	8.42	8.64
Poverty (%)	8.47	7.09	8.69	8.87	7.01	8.06	14.07
Mean household income ($)	67,059	76,135	77,469	84,061	91,234	85,146	72,227
Index	13	13	13	13	13	13	13

Table B. 26

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Braidwood Station, Illinois

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	3123	1.16	2463	68.12	660	74.71	-6.588***	(-5.70)
Black	3123	1.08	2463	18.34	660	13.56	4.786***	(4.42)
Asian	3123	0.27	2463	4.21	660	3.83	0.387	(1.46)
Native American	3123	0.02	2463	0.20	660	0.16	0.0342	(1.84)
Others	3123	0.46	2463	8.85	660	7.45	1.400**	(3.03)
Hispanic	3123	0.77	2463	14.44	660	14.23	0.215	(0.28)
Color	3123	1.26	2463	38.29	660	32.88	5.414***	(4.31)
White (2000)	3123	1.10	2463	70.28	660	79.91	-9.628***	(-8.79)
Black	3123	1.05	2463	18.07	660	11.50	6.563***	(6.28)
Asian	3123	0.19	2463	3.25	660	2.93	0.315	(1.62)
Native American	3123	0.01	2463	0.26	660	0.19	0.0691***	(4.71)
Others	3123	0.37	2463	8.07	660	5.31	2.764***	(7.54)
Hispanic	3123	0.63	2463	12.40	660	8.78	3.624***	(5.75)
Color	3123	1.18	2463	35.10	660	24.52	10.59***	(8.95)
White (1990)	3123	1.03	2463	75.69	660	87.15	-11.46***	(-11.11)
Black	3123	0.98	2463	16.82	660	8.63	8.190***	(8.34)
Asian	3123	0.14	2463	2.44	660	1.95	0.482***	(3.34)
Native American	3123	0.01	2463	0.23	660	0.17	0.0634***	(4.45)
Others	3123	0.30	2463	4.74	660	1.94	2.798***	(9.35)
Hispanic	3123	0.45	2463	8.57	660	4.50	4.070***	(8.98)
Color	3123	1.07	2463	27.87	660	15.14	12.73***	(11.92)

*p<0.05, **p<0.01, ***p<0.001

14. Byron Station, Illinois

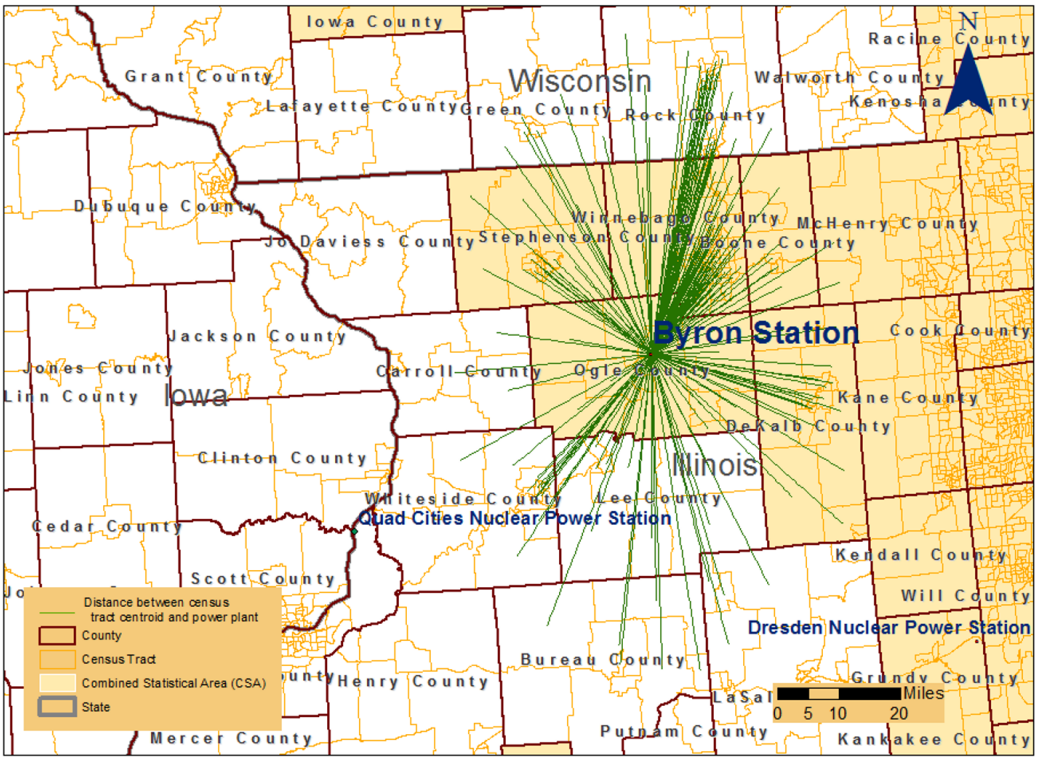

Figure B. 14 Distance to census-tract center points of census tracts within a 50-mile radius of Byron Station, Illinois in 1990, 2000, and 2010

Table B. 27

Demographic Composition of Population, as sorted by Distance from Byron Station, Illinois in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	5	60	66	38	30	199	4,333
Tract area (sq. mile)	300	945	1,657	1,443	1,283	5,627	117,783
Total population	19,736	206,595	243,810	125,999	110,481	706,621	15,615,730
White	19,556	176,787	229,393	116,345	108,690	650,771	12,821,452
Black	9	22,840	6,733	6,699	396	36,677	1,898,484
Asian	74	2,364	3,500	603	539	7,080	330,908
Native American	66	593	543	312	371	1,885	61,900
Others	29	4,006	3,647	2,044	484	10,210	502,957
Hispanic	161	7,220	7,513	3,985	1,495	20,374	945,920
Color	314	33,108	18,181	11,627	2,793	66,023	3,216,509
White (%)	99.09	85.57	94.09	92.34	98.38	92.10	82.11
Black (%)	0.05	11.06	2.76	5.32	0.36	5.19	12.16
Asian (%)	0.37	1.14	1.44	0.48	0.49	1.00	2.12
Native American (%)	0.33	0.29	0.22	0.25	0.34	0.27	0.40
Others (%)	0.15	1.94	1.50	1.62	0.44	1.44	3.22
Hispanic (%)	0.82	3.49	3.08	3.16	1.35	2.88	6.06
Color (%)	1.59	16.03	7.46	9.23	2.53	9.34	20.60
Female (%)	50.78	51.49	51.66	51.16	51.15	51.41	51.35
Elderly (65 + years) (%)	15.13	13.75	12.33	13.27	13.40	13.16	12.76
Kid (< 5 years) (%)	8.72	9.24	8.19	9.13	9.15	8.83	8.91
Native-born (%)	98.97	96.32	96.75	97.96	98.43	97.17	93.25
Renter housing units (%)	24.78	34.11	29.13	28.33	29.60	30.46	32.23
Education (%)	15.36	14.27	18.65	11.75	13.05	15.13	20.28
Unemployment (%)	5.27	5.84	4.85	5.46	5.14	5.30	6.24
Poverty (%)	5.90	11.95	9.59	10.43	8.55	10.17	11.61
Mean household income ($)	59,673	54,360	62,984	56,810	58,473	58,488	64,540
Year 2000							
Total population	22,901	212,942	281,564	136,609	119,531	773,547	17,009,420
White	22,342	168,157	252,652	122,351	114,697	680,199	13,216,918
Black	74	27,743	11,306	6,562	879	46,564	2,118,410
Asian	50	2,824	4,622	984	591	9,071	502,834
Native American	37	816	620	493	447	2,413	77,655
Others	398	13,398	12,369	6,218	2,914	35,297	1,093,607
Hispanic	415	19,204	15,692	9,248	3,596	48,155	1,672,035
Color	724	53,299	35,945	18,634	6,525	115,127	4,556,784
White (%)	97.56	78.97	89.73	89.56	95.96	87.93	77.70
Black (%)	0.32	13.03	4.02	4.80	0.74	6.02	12.45
Asian (%)	0.22	1.33	1.64	0.72	0.49	1.17	2.96
Native American (%)	0.16	0.38	0.22	0.36	0.37	0.31	0.46
Others (%)	1.74	6.29	4.39	4.55	2.44	4.56	6.43
Hispanic (%)	1.81	9.02	5.57	6.77	3.01	6.23	9.83
Color (%)	3.16	25.03	12.77	13.64	5.46	14.88	26.79
Female (%)	50.42	50.89	51.05	50.81	50.68	50.89	50.95
Elderly (65 + years) (%)	14.05	13.28	12.64	13.18	13.81	13.13	12.35
Kid (< 5 years) (%)	7.19	8.55	7.84	8.12	8.11	8.11	8.27
Native-born (%)	98.23	92.99	95.40	95.87	97.85	95.28	90.09
Renter housing units (%)	21.66	31.55	27.17	24.32	26.80	27.69	30.08
College degree or higher (%)	19.42	15.86	21.22	14.62	15.94	17.68	25.29
Unemployment (%)	4.06	6.69	5.38	5.63	4.61	5.61	5.62
Poverty (%)	6.48	12.16	8.21	7.67	6.48	8.88	10.13
Mean household income ($)	70,621	59,496	70,338	65,104	66,589	65,820	74,050
Year 2010							
Total population	23,750	214,649	314,446	145,769	123,031	821,645	17,561,660
White	23,038	167,268	275,854	129,839	115,327	711,326	13,339,905
Black	81	31,547	17,387	6,820	1,975	57,810	2,151,157
Asian	142	3,037	7,093	1,525	982	12,779	686,043
Native American	0	673	832	230	256	1,991	71,927
Others	489	12,124	13,280	7,355	4,491	37,739	1,312,629
Hispanic	544	28,712	28,391	14,340	6,498	78,485	2,171,992
Color	1,030	67,676	56,879	24,883	11,158	161,626	5,283,605
White (%)	97.00	77.93	87.73	89.07	93.74	86.57	75.96

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	0.34	14.70	5.53	4.68	1.61	7.04	12.25
Asian (%)	0.60	1.41	2.26	1.05	0.80	1.56	3.91
Native American (%)	0.00	0.31	0.26	0.16	0.21	0.24	0.41
Others (%)	2.06	5.65	4.22	5.05	3.65	4.59	7.47
Hispanic (%)	2.29	13.38	9.03	9.84	5.28	9.55	12.37
Color (%)	4.34	31.53	18.09	17.07	9.07	19.67	30.09
Female (%)	52.07	50.66	50.53	51.25	50.42	50.72	50.79
Elderly (65 + years) (%)	17.44	13.24	13.33	13.29	14.36	13.57	12.59
Kid (< 5 years) (%)	5.28	6.97	6.22	6.59	6.74	6.53	6.53
Native-born (%)	97.81	91.81	93.79	94.91	96.47	93.99	88.92
Renter housing units (%)	20.74	30.58	25.64	20.99	23.89	25.77	27.60
College degree or higher (%)	20.27	17.16	23.91	17.78	18.18	20.06	29.30
Unemployment (%)	8.18	10.99	8.96	8.87	7.91	9.27	7.92
Poverty (%)	6.96	19.34	12.03	12.21	11.58	13.77	12.26
Mean household income ($)	68,972	53,238	66,216	62,255	60,945	61,359	72,448
Index	14	14	14	14	14	14	14

Table B. 28

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Byron Station, Illinois

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	4532	1.23	4333	73.47	199	85.04	-11.56***	(-9.37)
Black	4532	1.01	4333	14.72	199	7.99	6.727***	(6.67)
Asian	4532	0.18	4333	3.61	199	1.47	2.143***	(11.73)
Native American	4532	0.05	4333	0.46	199	0.23	0.228***	(4.27)
Others	4532	0.37	4333	7.16	199	4.77	2.389***	(6.40)
Hispanic	4532	0.76	4333	11.81	199	9.63	2.176**	(2.85)
Color	4532	1.43	4333	31.74	199	20.69	11.05***	(7.74)
White (2000)	4532	1.20	4333	76.23	199	87.21	-10.99***	(-9.17)
Black	4532	1.00	4333	13.99	199	6.72	7.269***	(7.30)
Asian	4532	0.14	4333	2.77	199	1.15	1.621***	(11.46)
Native American	4532	0.05	4333	0.51	199	0.33	0.174**	(3.25)
Others	4532	0.38	4333	6.20	199	4.59	1.611***	(4.23)
Hispanic	4532	0.58	4333	9.33	199	6.27	3.060***	(5.26)
Color	4532	1.32	4333	27.65	199	15.61	12.04***	(9.12)
White (1990)	4532	1.10	4333	81.61	199	91.96	-10.35***	(-9.43)
Black	4532	1.00	4333	12.41	199	5.32	7.091***	(7.10)
Asian	4532	0.13	4333	1.99	199	1.01	0.980***	(7.72)
Native American	4532	0.05	4333	0.47	199	0.27	0.196***	(3.91)
Others	4532	0.25	4333	3.22	199	1.44	1.780***	(7.07)
Hispanic	4532	0.38	4333	6.04	199	2.85	3.188***	(8.47)
Color	4532	1.15	4333	20.73	199	9.46	11.27***	(9.83)

*p<0.05, **p<0.01, ***p<0.001

15. Clinton Power Station, Illinois

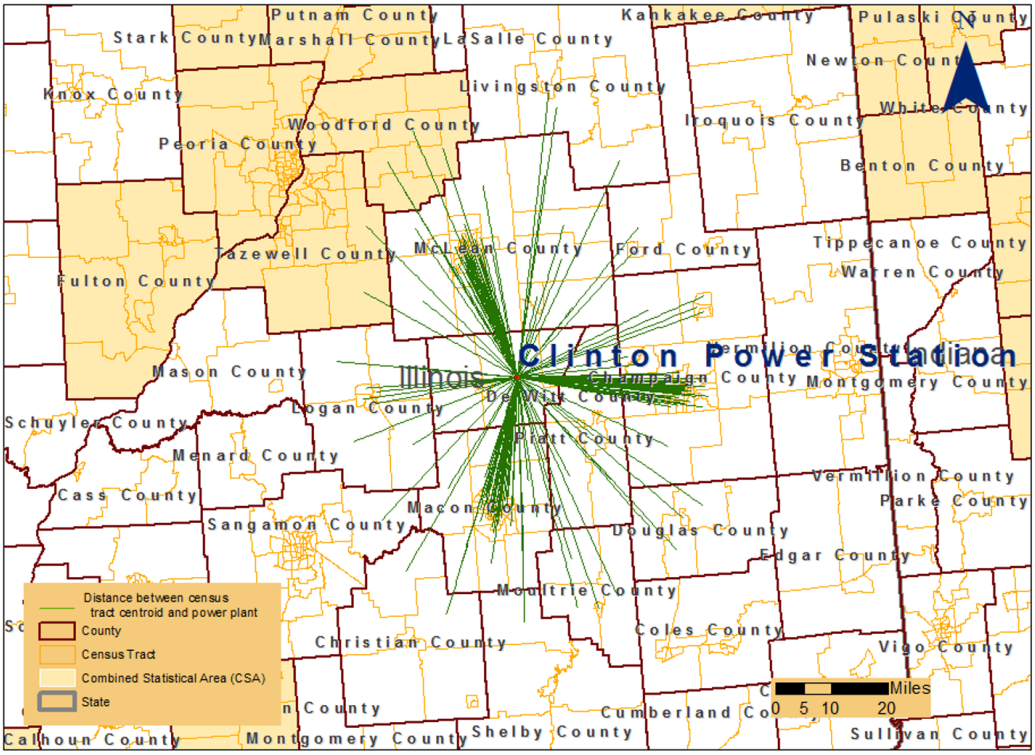

Figure B. 15 Distance to census-tract center points of census tracts within a 50-mile radius of Clinton Power Station, Illinois in 1990, 2000, and 2010

Table B. 29

Demographic Composition of Population, as sorted by Distance from Clinton Power Station, Illinois in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	4	10	90	37	13	154	2,969
Tract area (sq. mile)	254	823	1,713	1,783	1,278	5,851	52,063
Total population	13,021	35,172	303,709	147,650	48,624	548,176	10,882,407
White	12,902	34,568	272,592	128,355	48,287	496,704	8,461,209
Black	58	428	26,241	10,690	27	37,444	1,653,413
Asian	32	32	3,518	6,753	98	10,433	274,495
Native American	23	76	560	331	91	1,081	22,987
Others	6	65	800	1,522	121	2,514	470,291
Hispanic	74	157	2,410	3,242	505	6,388	872,300
Color	187	705	32,694	20,989	722	55,297	2,804,560
White (%)	99.09	98.28	89.75	86.93	99.31	90.61	77.75
Black (%)	0.45	1.22	8.64	7.24	0.06	6.83	15.19
Asian (%)	0.25	0.09	1.16	4.57	0.20	1.90	2.52
Native American (%)	0.18	0.22	0.18	0.22	0.19	0.20	0.21
Others (%)	0.05	0.18	0.26	1.03	0.25	0.46	4.32
Hispanic (%)	0.57	0.45	0.79	2.20	1.04	1.17	8.02
Color (%)	1.44	2.00	10.76	14.22	1.48	10.09	25.77
Female (%)	51.10	50.73	52.37	48.68	51.86	51.20	51.49
Elderly (65 + years) (%)	17.16	11.98	12.50	9.60	17.29	12.22	12.57
Kid (< 5 years) (%)	8.47	8.58	8.22	7.51	8.48	8.08	8.92
Native-born (%)	99.52	99.42	98.21	94.04	99.03	97.27	91.39
Renter housing units (%)	29.21	18.49	32.93	42.39	24.29	33.57	33.35
Education (%)	11.75	16.89	24.90	25.90	11.40	22.95	20.95
Unemployment (%)	6.19	4.54	5.01	4.53	4.21	4.81	6.73
Poverty (%)	10.30	5.76	12.27	16.59	9.31	12.59	11.87
Mean household income ($)	52,091	64,651	59,178	51,492	54,360	57,000	67,629
Year 2000							
Total population	13,049	39,455	325,882	148,972	50,051	577,409	11,841,884
White	12,783	38,295	276,875	123,571	48,937	500,461	8,623,103
Black	38	597	33,812	12,609	130	47,186	1,817,433
Asian	42	151	7,211	8,633	140	16,177	411,074
Native American	16	82	523	337	53	1,011	29,396
Others	170	328	7,460	3,821	791	12,570	960,882
Hispanic	197	330	6,547	3,481	994	11,549	1,517,592
Color	426	1,363	52,396	27,178	1,621	82,984	3,912,901
White (%)	97.96	97.06	84.96	82.95	97.77	86.67	72.82
Black (%)	0.29	1.51	10.38	8.46	0.26	8.17	15.35
Asian (%)	0.32	0.38	2.21	5.80	0.28	2.80	3.47
Native American (%)	0.12	0.21	0.16	0.23	0.11	0.18	0.25
Others (%)	1.30	0.83	2.29	2.56	1.58	2.18	8.11
Hispanic (%)	1.51	0.84	2.01	2.34	1.99	2.00	12.82
Color (%)	3.26	3.45	16.08	18.24	3.24	14.37	33.04
Female (%)	50.90	51.06	52.04	49.08	51.52	51.14	51.09
Elderly (65 + years) (%)	16.77	12.25	12.42	10.25	17.26	12.36	12.05
Kid (< 5 years) (%)	7.69	7.98	7.53	6.73	7.51	7.36	8.55
Native-born (%)	98.66	99.00	96.48	93.46	98.60	96.10	87.28
Renter housing units (%)	25.45	14.79	32.01	39.58	20.98	31.67	30.71
College degree or higher (%)	13.97	23.13	30.04	28.10	15.49	27.30	26.00
Unemployment (%)	5.53	2.78	6.38	5.58	3.06	5.64	6.07
Poverty (%)	8.67	3.78	11.31	16.81	6.13	11.60	10.64
Mean household income ($)	60,631	76,044	65,546	57,685	63,521	64,024	77,324
Year 2010							
Total population	12,773	42,132	345,193	156,890	51,188	608,176	12,137,183
White	12,443	40,037	278,517	124,655	49,878	505,530	8,631,150
Black	75	590	40,759	15,948	136	57,508	1,802,797
Asian	17	415	13,732	11,405	232	25,801	549,026
Native American	0	68	433	469	36	1,006	23,723
Others	238	1,022	11,752	4,413	906	18,331	1,130,487
Hispanic	306	798	12,117	6,464	1,576	21,261	1,918,667
Color	460	2,508	73,374	36,393	2,267	115,002	4,427,707
White (%)	97.42	95.03	80.68	79.45	97.44	83.12	71.11

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	0.59	1.40	11.81	10.17	0.27	9.46	14.85
Asian (%)	0.13	0.98	3.98	7.27	0.45	4.24	4.52
Native American (%)	0.00	0.16	0.13	0.30	0.07	0.17	0.20
Others (%)	1.86	2.43	3.40	2.81	1.77	3.01	9.31
Hispanic (%)	2.40	1.89	3.51	4.12	3.08	3.50	15.81
Color (%)	3.60	5.95	21.26	23.20	4.43	18.91	36.48
Female (%)	51.00	50.25	51.67	49.06	51.48	50.87	50.96
Elderly (65 + years) (%)	17.11	14.28	12.43	10.23	16.46	12.43	12.30
Kid (< 5 years) (%)	4.96	6.20	6.53	5.07	6.94	6.13	6.66
Native-born (%)	98.26	97.80	94.60	91.27	98.03	94.33	85.98
Renter housing units (%)	24.75	13.74	30.59	37.37	19.42	30.09	27.78
College degree or higher (%)	13.51	27.62	34.75	30.53	17.01	31.14	30.24
Unemployment (%)	7.42	4.84	6.50	7.09	5.47	6.47	8.70
Poverty (%)	8.62	7.18	14.40	20.83	10.62	14.95	12.53
Mean household income ($)	54,808	77,212	65,965	56,181	60,541	63,666	75,738
Index	15	15	15	15	15	15	15

Table B. 30

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Clinton Power Station, Illinois

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	3123	1.59	2969	68.83	154	82.53	-13.70***	(-8.59)
Black	3123	1.39	2969	17.68	154	10.51	7.170***	(5.17)
Asian	3123	0.58	2969	4.15	154	3.77	0.376	(0.65)
Native American	3123	0.03	2969	0.19	154	0.18	0.00876	(0.25)
Others	3123	0.34	2969	8.84	154	3.00	5.841***	(17.23)
Hispanic	3123	0.49	2969	14.97	154	3.38	11.59***	(23.52)
Color	3123	1.65	2969	38.07	154	19.41	18.66***	(11.29)
White (2000)	3123	1.45	2969	71.61	154	85.93	-14.32***	(-9.89)
Black	3123	1.29	2969	17.08	154	8.91	8.176***	(6.35)
Asian	3123	0.46	2969	3.20	154	2.74	0.466	(1.02)
Native American	3123	0.03	2969	0.24	154	0.18	0.0652*	(2.41)
Others	3123	0.28	2969	7.76	154	2.25	5.511***	(19.92)
Hispanic	3123	0.42	2969	12.13	154	2.09	10.04***	(24.11)
Color	3123	1.50	2969	33.79	154	15.15	18.64***	(12.42)
White (1990)	3123	1.34	2969	77.49	154	90.23	-12.74***	(-9.51)
Black	3123	1.25	2969	15.49	154	7.29	8.205***	(6.58)
Asian	3123	0.44	2969	2.36	154	1.86	0.497	(1.12)
Native American	3123	0.03	2969	0.22	154	0.20	0.0153	(0.54)
Others	3123	0.21	2969	4.34	154	0.40	3.934***	(18.45)
Hispanic	3123	0.32	2969	8.05	154	1.07	6.983***	(21.73)
Color	3123	1.37	2969	25.94	154	10.44	15.51***	(11.35)

*p<0.05, **p<0.01, ***p<0.001

16. Dresden Nuclear Power Station, Illinois

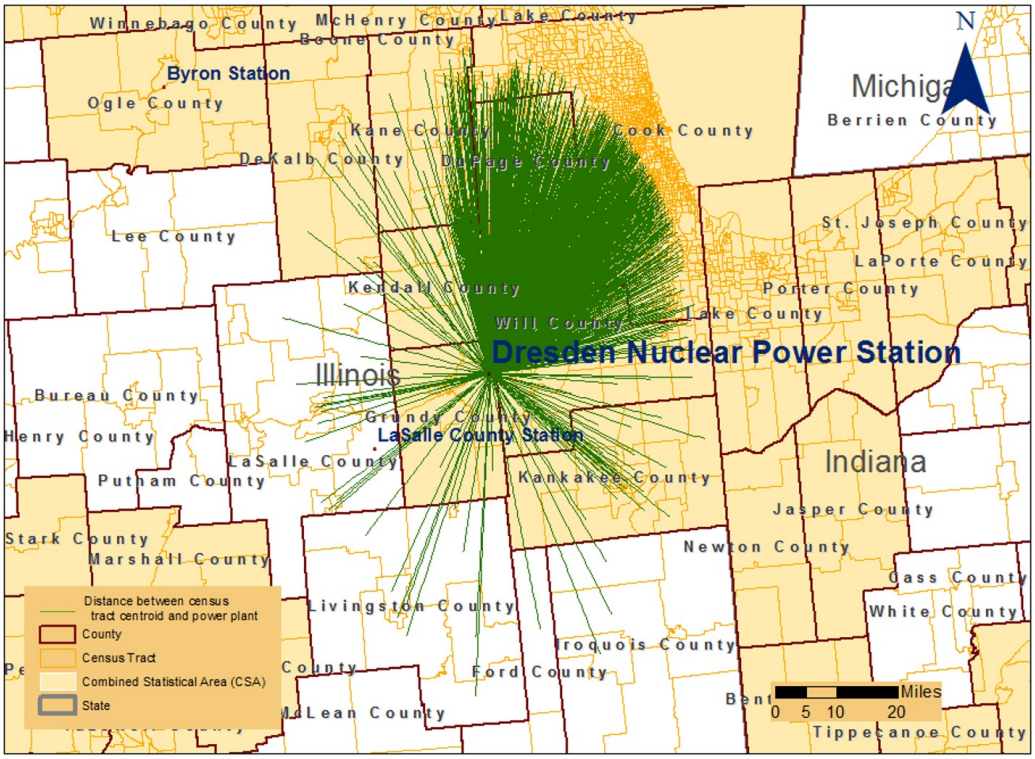

Figure B. 16 Distance to census-tract center points of census tracts within a 50-mile radius of Dresden Nuclear Power Station, Illinois in 1990, 2000, and 2010

Table B. 31

Demographic Composition of Population, as sorted by Distance from Dresden Nuclear Power Station, Illinois in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	17	85	212	413	310	1,037	2,086
Tract area (sq. mile)	251	952	1,729	1,820	1,085	5,838	52,075
Total population	44,647	200,027	726,503	1,677,784	1,252,112	3,901,073	7,529,510
White	43,455	165,920	629,535	1,293,755	882,651	3,015,316	5,942,597
Black	520	24,232	59,011	318,961	227,662	630,386	1,060,471
Asian	216	1,291	17,344	31,150	39,954	89,955	194,973
Native American	96	516	1,171	2,577	1,965	6,325	17,743
Others	363	8,076	19,417	31,348	99,874	159,078	313,727
Hispanic	957	13,800	40,275	74,537	173,573	303,142	575,546
Color	1,736	39,486	116,706	425,491	441,282	1,024,701	1,835,156
White (%)	97.33	82.95	86.65	77.11	70.49	77.29	78.92
Black (%)	1.16	12.11	8.12	19.01	18.18	16.16	14.08
Asian (%)	0.48	0.65	2.39	1.86	3.19	2.31	2.59
Native American (%)	0.22	0.26	0.16	0.15	0.16	0.16	0.24
Others (%)	0.81	4.04	2.67	1.87	7.98	4.08	4.17
Hispanic (%)	2.14	6.90	5.54	4.44	13.86	7.77	7.64
Color (%)	3.89	19.74	16.06	25.36	35.24	26.27	24.37
Female (%)	49.54	50.14	50.91	51.88	51.23	51.37	51.52
Elderly (65 + years) (%)	9.79	11.21	8.70	12.78	10.48	11.16	13.27
Kid (< 5 years) (%)	9.45	9.21	10.10	8.88	9.52	9.34	8.65
Native-born (%)	98.27	95.86	94.17	93.58	86.33	91.53	91.74
Renter housing units (%)	23.06	26.18	23.93	24.58	34.79	27.80	35.93
Education (%)	14.00	14.24	24.78	22.52	18.44	21.12	21.00
Unemployment (%)	5.00	6.31	4.38	6.01	6.97	6.02	6.97
Poverty (%)	5.18	8.27	5.23	7.30	9.55	7.67	14.13
Mean household income ($)	70,896	65,575	80,845	76,836	68,798	74,364	63,637
Year 2000							
Total population	54,839	265,028	922,960	1,773,233	1,416,976	4,433,036	7,986,257
White	52,169	215,458	739,064	1,227,569	867,821	3,102,081	6,021,483
Black	957	28,127	94,872	387,663	255,674	767,293	1,097,326
Asian	222	3,269	35,311	47,345	66,231	152,378	274,873
Native American	64	691	1,861	3,553	4,621	10,790	19,617
Others	1,430	17,485	51,847	107,099	222,622	400,483	572,969
Hispanic	2,211	29,986	87,602	172,023	374,398	666,220	862,921
Color	3,938	64,131	229,701	631,684	714,761	1,644,215	2,351,670
White (%)	95.13	81.30	80.08	69.23	61.24	69.98	75.40
Black (%)	1.75	10.61	10.28	21.86	18.04	17.31	13.74
Asian (%)	0.40	1.23	3.83	2.67	4.67	3.44	3.44
Native American (%)	0.12	0.26	0.20	0.20	0.33	0.24	0.25
Others (%)	2.61	6.60	5.62	6.04	15.71	9.03	7.17
Hispanic (%)	4.03	11.31	9.49	9.70	26.42	15.03	10.81
Color (%)	7.18	24.20	24.89	35.62	50.44	37.09	29.45
Female (%)	49.57	49.71	50.96	51.81	50.88	51.18	51.04
Elderly (65 + years) (%)	9.53	10.06	9.12	12.85	9.47	10.78	12.78
Kid (< 5 years) (%)	8.44	9.99	9.40	8.58	9.79	9.22	8.09
Native-born (%)	97.63	93.12	90.10	89.40	77.47	86.06	88.59
Renter housing units (%)	19.83	21.05	19.47	23.43	32.69	25.27	33.43
College degree or higher (%)	18.28	18.79	31.09	27.35	22.06	25.86	26.17
Unemployment (%)	4.46	4.96	4.23	5.93	6.63	5.70	6.24
Poverty (%)	3.99	6.96	5.10	7.91	10.34	8.00	12.19
Mean household income ($)	82,461	76,446	93,541	84,662	77,382	83,743	73,119
Year 2010							
Total population	73,784	359,685	1,099,335	1,769,057	1,399,088	4,700,949	8,044,410
White	69,424	283,718	808,646	1,159,665	806,821	3,128,274	6,008,406
Black	2,059	37,128	127,911	402,725	230,682	800,505	1,059,800
Asian	436	7,531	61,015	55,901	87,939	212,822	362,005
Native American	61	328	2,105	3,074	3,452	9,020	15,709
Others	1,804	30,980	99,658	147,692	270,194	550,328	598,490
Hispanic	5,248	66,368	167,090	276,799	458,204	973,709	966,219
Color	8,251	116,606	372,202	753,852	789,596	2,040,507	2,502,202
White (%)	94.09	78.88	73.56	65.55	57.67	66.55	74.69

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	2.79	10.32	11.64	22.76	16.49	17.03	13.17
Asian (%)	0.59	2.09	5.55	3.16	6.29	4.53	4.50
Native American (%)	0.08	0.09	0.19	0.17	0.25	0.19	0.20
Others (%)	2.44	8.61	9.07	8.35	19.31	11.71	7.44
Hispanic (%)	7.11	18.45	15.20	15.65	32.75	20.71	12.01
Color (%)	11.18	32.42	33.86	42.61	56.44	43.41	31.10
Female (%)	49.78	50.04	51.05	51.73	50.75	51.12	50.87
Elderly (65 + years) (%)	9.59	9.56	10.11	12.86	9.74	10.99	13.07
Kid (< 5 years) (%)	7.06	7.99	7.05	6.45	7.75	7.10	6.35
Native-born (%)	96.74	89.36	86.80	87.02	75.06	83.74	87.91
Renter housing units (%)	15.50	17.87	18.43	22.83	30.04	23.43	30.15
College degree or higher (%)	21.83	22.93	34.85	30.84	24.95	29.32	30.82
Unemployment (%)	8.57	8.40	7.86	9.81	9.78	9.21	8.23
Poverty (%)	5.75	8.51	7.22	10.60	12.77	10.22	14.08
Mean household income ($)	79,156	76,132	89,143	81,429	71,974	80,096	72,559
Index	16	16	16	16	16	16	16

Table B. 32

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Dresden Nuclear Power Station, Illinois

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	3123	1.15	2086	71.77	1037	64.96	6.812***	(5.91)
Black	3123	1.14	2086	16.46	1037	19.08	-2.626*	(-2.29)
Asian	3123	0.25	2086	4.05	1037	4.30	-0.252	(-1.00)
Native American	3123	0.02	2086	0.19	1037	0.18	0.00933	(0.54)
Others	3123	0.54	2086	7.24	1037	11.18	-3.942***	(-7.31)
Hispanic	3123	0.85	2086	11.62	1037	19.97	-8.350***	(-9.78)
Color	3123	1.23	2086	33.51	1037	44.45	-10.94***	(-8.88)
White (2000)	3123	1.15	2086	73.36	1037	70.23	3.131**	(2.72)
Black	3123	1.14	2086	16.22	1037	17.60	-1.382	(-1.21)
Asian	3123	0.19	2086	3.11	1037	3.32	-0.209	(-1.09)
Native American	3123	0.02	2086	0.24	1037	0.24	0.00541	(0.33)
Others	3123	0.47	2086	6.97	1037	8.52	-1.546***	(-3.32)
Hispanic	3123	0.76	2086	10.36	1037	14.21	-3.849***	(-5.06)
Color	3123	1.23	2086	31.10	1037	36.42	-5.324***	(-4.31)
White (1990)	3123	1.15	2086	77.70	1037	78.96	-1.26	(-1.10)
Black	3123	1.12	2086	15.28	1037	14.71	0.571	(0.51)
Asian	3123	0.15	2086	2.39	1037	2.23	0.156	(1.06)
Native American	3123	0.01	2086	0.24	1037	0.17	0.0752***	(5.53)
Others	3123	0.39	2086	4.30	1037	3.84	0.46	(1.20)
Hispanic	3123	0.56	2086	7.84	1037	7.43	0.411	(0.73)
Color	3123	1.19	2086	25.56	1037	24.41	1.149	(0.97)

*p<0.05, **p<0.01, ***p<0.001

17. LaSalle County Station, Illinois

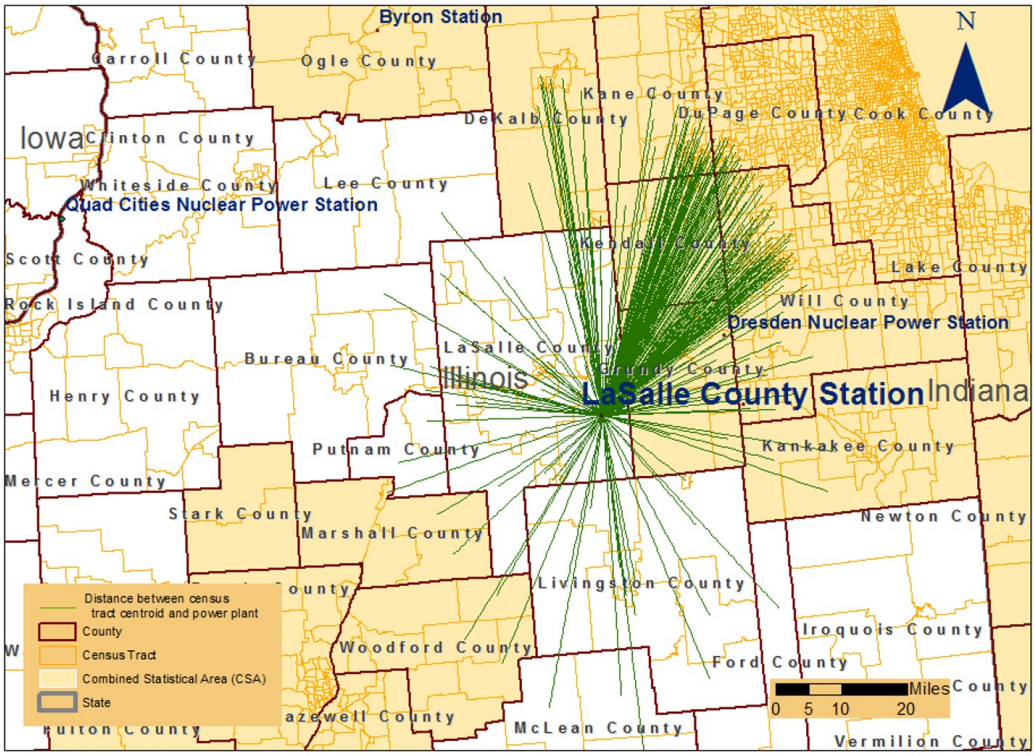

Figure B. 17 Distance to census-tract center points of census tracts within a 50-mile radius of LaSalle County Station, Illinois in 1990, 2000, and 2010

Table B. 33

Demographic Composition of Population, as sorted by Distance from LaSalle County Station, Illinois in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	3	25	36	93	78	235	2,888
Tract area (sq. mile)	188	1,133	1,545	1,931	978	5,775	52,139
Total population	10,831	94,231	110,499	244,400	223,305	683,266	10,747,317
White	10,725	91,717	106,268	207,604	191,201	607,515	8,350,398
Black	23	1,048	2,243	25,300	14,318	42,932	1,647,925
Asian	41	208	499	1,737	3,508	5,993	278,935
Native American	39	263	213	509	419	1,443	22,625
Others	3	996	1,276	9,272	13,844	25,391	447,414
Hispanic	95	2,607	2,535	16,504	26,543	48,284	830,404
Color	190	4,144	5,476	43,685	44,387	97,882	2,761,975
White (%)	99.02	97.33	96.17	84.94	85.62	88.91	77.70
Black (%)	0.21	1.11	2.03	10.35	6.41	6.28	15.33
Asian (%)	0.38	0.22	0.45	0.71	1.57	0.88	2.60
Native American (%)	0.36	0.28	0.19	0.21	0.19	0.21	0.21
Others (%)	0.03	1.06	1.15	3.79	6.20	3.72	4.16
Hispanic (%)	0.88	2.77	2.29	6.75	11.89	7.07	7.73
Color (%)	1.75	4.40	4.96	17.87	19.88	14.33	25.70
Female (%)	50.08	50.89	50.44	50.26	50.43	50.43	51.54
Elderly (65 + years) (%)	14.63	16.04	13.80	12.27	8.73	11.92	12.59
Kid (< 5 years) (%)	8.20	8.41	8.68	9.09	11.34	9.65	8.84
Native-born (%)	99.34	98.37	98.23	95.85	92.61	95.58	91.42
Renter housing units (%)	21.94	26.92	24.16	26.20	27.94	26.45	33.77
Education (%)	8.43	10.72	11.30	14.14	24.83	16.46	21.33
Unemployment (%)	9.15	6.92	5.78	5.61	4.55	5.49	6.71
Poverty (%)	9.59	10.36	8.02	8.04	6.66	7.93	12.16
Mean household income ($)	52,577	55,557	58,868	64,361	75,609	65,522	67,207
Year 2000							
Total population	11,165	99,235	125,264	318,005	333,166	886,835	11,532,458
White	10,930	94,847	118,096	261,283	265,495	750,651	8,372,913
Black	11	1,763	2,616	30,533	22,255	57,178	1,807,441
Asian	57	372	525	4,327	12,869	18,150	409,101
Native American	17	131	257	917	782	2,104	28,303
Others	150	2,125	3,775	20,992	31,724	58,766	914,686
Hispanic	110	4,512	5,403	35,981	57,740	103,746	1,425,395
Color	312	7,297	9,867	74,183	97,297	188,956	3,806,929
White (%)	97.90	95.58	94.28	82.16	79.69	84.64	72.60
Black (%)	0.10	1.78	2.09	9.60	6.68	6.45	15.67
Asian (%)	0.51	0.37	0.42	1.36	3.86	2.05	3.55
Native American (%)	0.15	0.13	0.21	0.29	0.23	0.24	0.25
Others (%)	1.34	2.14	3.01	6.60	9.52	6.63	7.93
Hispanic (%)	0.99	4.55	4.31	11.31	17.33	11.70	12.36
Color (%)	2.79	7.35	7.88	23.33	29.20	21.31	33.01
Female (%)	50.70	50.20	50.29	49.90	50.17	50.10	51.17
Elderly (65 + years) (%)	14.46	15.33	12.88	10.83	6.96	10.22	12.21
Kid (< 5 years) (%)	7.59	7.55	7.95	10.00	11.25	9.87	8.39
Native-born (%)	98.82	97.76	97.46	93.08	86.44	91.80	87.37
Renter housing units (%)	18.67	25.08	20.14	21.21	21.00	21.42	31.43
College degree or higher (%)	10.20	13.30	15.28	20.05	36.60	24.42	26.18
Unemployment (%)	4.59	5.74	4.35	4.90	4.03	4.58	6.16
Poverty (%)	7.13	8.01	6.68	6.86	5.28	6.36	11.01
Mean household income ($)	61,628	63,822	69,120	76,227	97,065	80,932	76,366
Year 2010							
Total population	12,195	107,361	146,245	446,375	425,689	1,137,865	11,607,494
White	11,724	101,516	134,898	350,749	297,318	896,205	8,240,475
Black	0	1,681	3,965	43,871	30,892	80,409	1,779,896
Asian	61	553	1,142	12,663	31,579	45,998	528,829
Native American	2	96	235	476	1,098	1,907	22,822
Others	408	3,515	6,005	38,616	64,802	113,346	1,035,472
Hispanic	568	6,639	10,533	84,372	100,559	202,671	1,737,257
Color	905	10,609	17,192	148,063	169,611	346,380	4,196,329
White (%)	96.14	94.56	92.24	78.58	69.84	78.76	70.99

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	0.00	1.57	2.71	9.83	7.26	7.07	15.33
Asian (%)	0.50	0.52	0.78	2.84	7.42	4.04	4.56
Native American (%)	0.02	0.09	0.16	0.11	0.26	0.17	0.20
Others (%)	3.35	3.27	4.11	8.65	15.22	9.96	8.92
Hispanic (%)	4.66	6.18	7.20	18.90	23.62	17.81	14.97
Color (%)	7.42	9.88	11.76	33.17	39.84	30.44	36.15
Female (%)	52.04	50.15	50.02	49.94	50.43	50.18	51.04
Elderly (65 + years) (%)	16.06	14.84	12.25	9.74	7.61	9.82	12.55
Kid (< 5 years) (%)	6.10	6.19	6.40	8.16	8.21	7.74	6.52
Native-born (%)	98.82	96.70	96.44	89.10	82.12	88.25	86.19
Renter housing units (%)	18.09	23.37	16.60	18.12	20.98	19.50	28.62
College degree or higher (%)	15.79	16.19	19.23	24.75	40.28	28.65	30.43
Unemployment (%)	9.64	9.62	8.12	8.14	7.37	8.00	8.65
Poverty (%)	7.94	9.59	7.89	8.38	7.87	8.23	13.07
Mean household income ($)	62,441	64,620	72,170	76,444	94,070	80,807	74,629
Index	17	17	17	17	17	17	17

Table B. 34

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding LaSalle County Station, Illinois

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	3123	1.42	2888	68.72	235	79.16	-10.44***	(-7.37)
Black	3123	0.94	2888	18.14	235	7.32	10.83***	(11.56)
Asian	3123	0.42	2888	4.18	235	3.49	0.691	(1.66)
Native American	3123	0.03	2888	0.19	235	0.16	0.0289	(1.07)
Others	3123	0.82	2888	8.48	235	9.44	-0.963	(-1.18)
Hispanic	3123	1.33	2888	14.19	235	16.94	-2.748*	(-2.07)
Color	3123	1.74	2888	37.79	235	29.19	8.601***	(4.95)
White (2000)	3123	1.23	2888	71.29	235	84.91	-13.61***	(-11.08)
Black	3123	0.98	2888	17.50	235	6.55	10.95***	(11.20)
Asian	3123	0.22	2888	3.27	235	2.06	1.210***	(5.60)
Native American	3123	0.02	2888	0.24	235	0.23	0.0161	(0.69)
Others	3123	0.58	2888	7.59	235	6.24	1.350*	(2.33)
Hispanic	3123	1.08	2888	11.69	235	10.92	0.773	(0.72)
Color	3123	1.57	2888	33.86	235	20.68	13.17***	(8.40)
White (1990)	3123	1.20	2888	77.12	235	90.31	-13.18***	(-10.98)
Black	3123	0.99	2888	15.86	235	5.61	10.25***	(10.39)
Asian	3123	0.13	2888	2.44	235	1.04	1.400***	(10.59)
Native American	3123	0.02	2888	0.22	235	0.21	0.0106	(0.43)
Others	3123	0.49	2888	4.25	235	2.83	1.425**	(2.91)
Hispanic	3123	0.74	2888	7.86	235	5.75	2.110**	(2.85)
Color	3123	1.35	2888	26.21	235	12.49	13.72***	(10.13)

*p<0.05, **p<0.01, ***p<0.001

18. Quad Cities Nuclear Power Station, Illinois

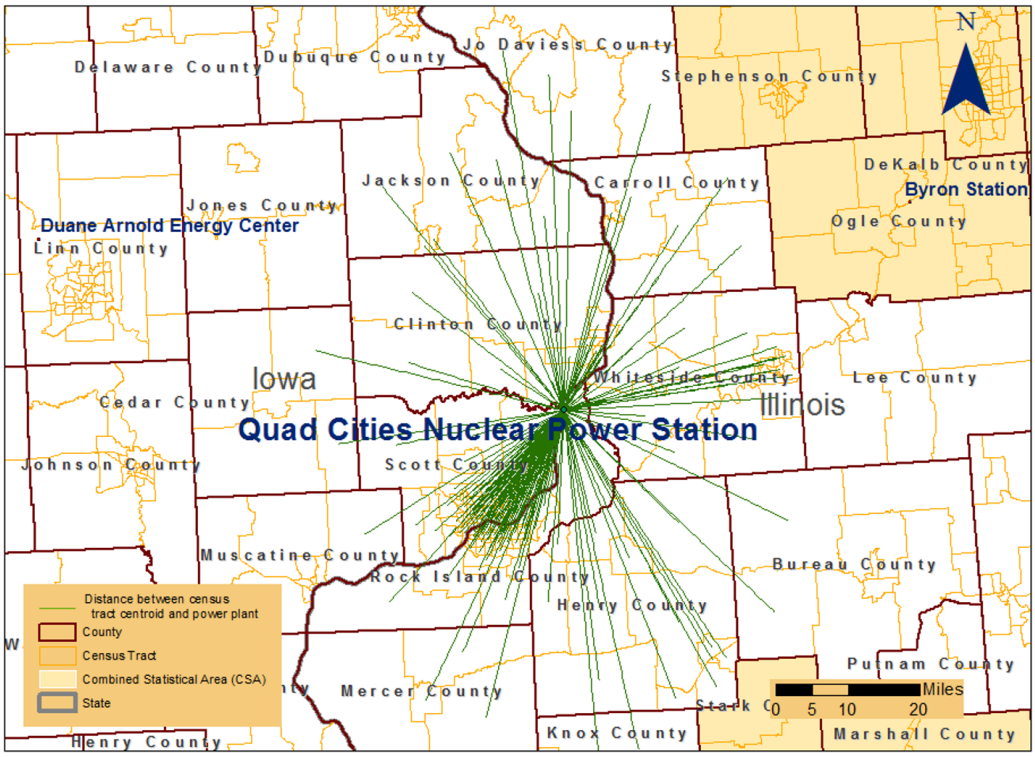

Figure B. 18 Distance to census-tract center points of census tracts within a 50-mile radius of Quad Cities Nuclear Power Station, Illinois in 1990, 2000, and 2010

Table B. 35

Demographic Composition of Population, as sorted by Distance from Quad Cities Nuclear Power Station, Illinois in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	7	63	51	22	11	154	3,794
Tract area (sq. mile)	272	909	1,628	2,047	968	5,824	108,363
Total population	33,742	226,327	169,415	72,924	37,153	539,561	13,667,777
White	33,015	209,709	156,924	70,767	36,474	506,889	11,136,128
Black	438	10,299	8,520	485	406	20,148	1,717,967
Asian	68	1,568	985	233	82	2,936	306,319
Native American	131	723	526	126	57	1,563	30,316
Others	88	4,030	2,460	1,318	129	8,025	477,042
Hispanic	322	8,889	5,783	2,342	298	17,634	891,696
Color	967	21,410	15,555	3,191	910	42,033	2,927,212
White (%)	97.85	92.66	92.63	97.04	98.17	93.94	81.48
Black (%)	1.30	4.55	5.03	0.67	1.09	3.73	12.57
Asian (%)	0.20	0.69	0.58	0.32	0.22	0.54	2.24
Native American (%)	0.39	0.32	0.31	0.17	0.15	0.29	0.22
Others (%)	0.26	1.78	1.45	1.81	0.35	1.49	3.49
Hispanic (%)	0.95	3.93	3.41	3.21	0.80	3.27	6.52
Color (%)	2.87	9.46	9.18	4.38	2.45	7.79	21.42
Female (%)	51.39	51.71	51.57	51.37	52.25	51.64	51.49
Elderly (65 + years) (%)	14.19	12.95	14.99	16.09	19.39	14.54	13.04
Kid (< 5 years) (%)	8.30	8.98	8.53	8.19	7.60	8.59	8.80
Native-born (%)	99.26	97.77	98.16	98.80	99.05	98.21	92.79
Renter housing units (%)	23.73	31.72	27.53	24.88	22.96	28.35	32.41
Education (%)	14.43	19.45	12.39	10.91	11.04	15.14	20.43
Unemployment (%)	6.74	5.82	6.35	5.15	6.23	5.98	6.23
Poverty (%)	9.75	11.78	13.14	10.25	11.54	11.85	11.82
Mean household income ($)	54,959	56,525	51,892	52,878	47,269	53,843	64,541
Year 2000							
Total population	32,764	234,762	169,147	74,209	36,753	547,635	14,797,982
White	31,489	209,459	151,031	70,901	35,260	498,140	11,375,161
Black	518	11,027	9,844	426	372	22,187	1,902,190
Asian	128	3,049	1,040	318	89	4,624	458,605
Native American	127	967	620	158	31	1,903	37,767
Others	500	10,261	6,613	2,408	999	20,781	1,024,259
Hispanic	641	14,572	8,323	3,413	805	27,754	1,582,888
Color	1,666	32,245	21,690	4,776	1,809	62,186	4,146,997
White (%)	96.11	89.22	89.29	95.54	95.94	90.96	76.87
Black (%)	1.58	4.70	5.82	0.57	1.01	4.05	12.85
Asian (%)	0.39	1.30	0.61	0.43	0.24	0.84	3.10
Native American (%)	0.39	0.41	0.37	0.21	0.08	0.35	0.26
Others (%)	1.53	4.37	3.91	3.24	2.72	3.79	6.92
Hispanic (%)	1.96	6.21	4.92	4.60	2.19	5.07	10.70
Color (%)	5.08	13.74	12.82	6.44	4.92	11.36	28.02
Female (%)	50.63	51.44	50.94	50.54	51.92	51.14	51.07
Elderly (65 + years) (%)	14.70	13.27	15.27	16.16	19.54	14.79	12.53
Kid (< 5 years) (%)	7.30	8.19	7.48	7.26	7.14	7.72	8.38
Native-born (%)	98.97	96.08	97.43	98.06	98.56	97.10	89.16
Renter housing units (%)	21.03	28.94	24.52	21.59	19.99	25.45	29.93
College degree or higher (%)	15.78	22.23	14.76	13.29	14.54	17.75	25.41
Unemployment (%)	5.03	5.07	6.04	4.35	5.18	5.27	5.69
Poverty (%)	9.14	9.69	10.96	8.13	9.21	9.80	10.41
Mean household income ($)	61,306	63,441	59,077	62,467	54,935	61,258	74,051
Year 2010							
Total population	32,223	237,903	165,804	71,555	36,903	544,388	15,217,238
White	30,401	205,786	145,270	67,243	35,820	484,520	11,425,570
Black	760	14,681	10,773	830	355	27,399	1,915,588
Asian	209	3,790	2,016	271	147	6,433	619,718
Native American	95	514	379	236	108	1,332	33,222
Others	758	13,132	7,366	2,975	473	24,704	1,223,140
Hispanic	791	17,435	11,421	4,714	1,316	35,677	2,041,183
Color	2,259	40,532	26,967	6,918	2,078	78,754	4,783,553
White (%)	94.35	86.50	87.62	93.97	97.07	89.00	75.08

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	2.36	6.17	6.50	1.16	0.96	5.03	12.59
Asian (%)	0.65	1.59	1.22	0.38	0.40	1.18	4.07
Native American (%)	0.29	0.22	0.23	0.33	0.29	0.24	0.22
Others (%)	2.35	5.52	4.44	4.16	1.28	4.54	8.04
Hispanic (%)	2.45	7.33	6.89	6.59	3.57	6.55	13.41
Color (%)	7.01	17.04	16.26	9.67	5.63	14.47	31.44
Female (%)	50.30	50.85	51.29	50.48	50.36	50.87	50.90
Elderly (65 + years) (%)	16.25	14.07	16.30	17.65	20.15	15.76	12.68
Kid (< 5 years) (%)	5.06	6.93	5.87	5.84	5.57	6.26	6.63
Native-born (%)	98.56	95.59	96.30	98.06	98.25	96.49	87.89
Renter housing units (%)	19.74	27.48	23.01	19.68	21.90	24.22	27.34
College degree or higher (%)	18.22	27.15	18.02	18.18	18.35	21.99	29.44
Unemployment (%)	6.68	6.05	6.66	6.06	6.83	6.33	7.99
Poverty (%)	10.01	11.82	12.54	9.91	13.11	11.76	12.46
Mean household income ($)	64,349	64,003	57,579	61,077	52,949	60,911	72,883
Index	18	18	18	18	18	18	18

Table B. 36

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Quad Cities Nuclear Power Station, Illinois

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	3948	1.22	3794	73.60	154	88.10	-14.50***	(-11.92)
Black	3948	0.96	3794	14.66	154	5.66	9.005***	(9.39)
Asian	3948	0.19	3794	3.68	154	1.16	2.517***	(13.38)
Native American	3948	0.03	3794	0.22	154	0.25	-0.0269	(-0.87)
Others	3948	0.51	3794	7.54	154	4.83	2.714***	(5.33)
Hispanic	3948	0.80	3794	12.52	154	7.15	5.371***	(6.72)
Color	3948	1.40	3794	32.20	154	15.68	16.52***	(11.83)
White (2000)	3948	1.15	3794	76.27	154	89.99	-13.72***	(-11.96)
Black	3948	0.95	3794	14.02	154	4.78	9.246***	(9.73)
Asian	3948	0.13	3794	2.83	154	0.84	1.996***	(15.57)
Native American	3948	0.04	3794	0.25	154	0.37	-0.118**	(-2.86)
Others	3948	0.41	3794	6.52	154	4.03	2.493***	(6.06)
Hispanic	3948	0.64	3794	9.95	154	5.36	4.592***	(7.17)
Color	3948	1.28	3794	28.14	154	12.43	15.71***	(12.31)
White (1990)	3948	1.06	3794	81.52	154	93.07	-11.55***	(-10.91)
Black	3948	0.97	3794	12.65	154	4.50	8.146***	(8.37)
Asian	3948	0.10	3794	2.08	154	0.55	1.524***	(15.43)
Native American	3948	0.04	3794	0.23	154	0.31	-0.0873*	(-2.12)
Others	3948	0.28	3794	3.44	154	1.56	1.878***	(6.66)
Hispanic	3948	0.50	3794	6.44	154	3.43	3.011***	(6.03)
Color	3948	1.15	3794	21.25	154	8.75	12.51***	(10.84)

*p<0.05, **p<0.01, ***p<0.001

19. Duane Arnold Energy Center, Iowa

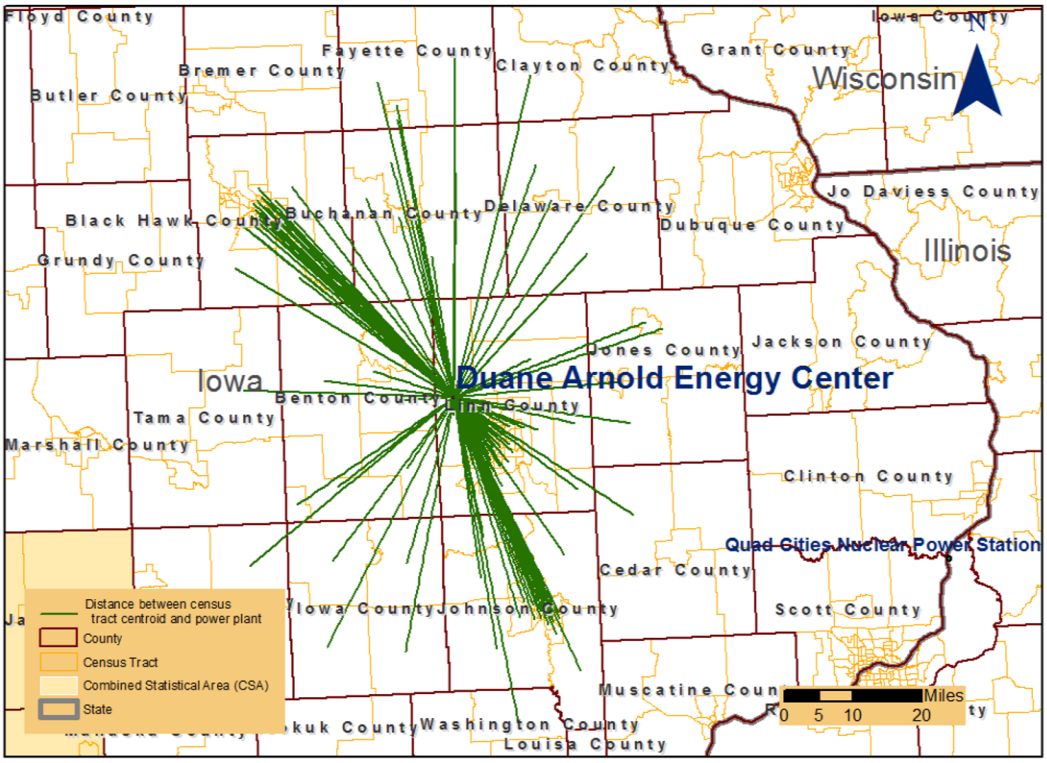

Figure B. 19 Distance to census-tract center points of census tracts within a 50-mile radius of Duane Arnold Energy Center, Iowa in 1990, 2000, and 2010

Table B. 37

Demographic Composition of Population, as sorted by Distance from Duane Arnold Energy Center, Iowa in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	22	27	16	50	14	129	696
Tract area (sq. mile)	291	973	1,505	1,955	1,071	5,795	50,478
Total population	77,265	102,461	63,200	176,101	43,929	462,956	2,313,799
White	75,417	98,804	62,432	164,558	40,575	441,786	2,243,318
Black	824	2,413	408	6,638	2,978	13,261	33,997
Asian	734	762	160	4,094	165	5,915	18,412
Native American	86	230	91	214	111	732	7,079
Others	202	253	112	596	98	1,261	11,001
Hispanic	608	749	253	1,645	368	3,623	27,019
Color	2,266	4,164	887	12,611	3,604	23,532	85,856
White (%)	97.61	96.43	98.78	93.45	92.36	95.43	96.95
Black (%)	1.07	2.36	0.65	3.77	6.78	2.86	1.47
Asian (%)	0.95	0.74	0.25	2.32	0.38	1.28	0.80
Native American (%)	0.11	0.22	0.14	0.12	0.25	0.16	0.31
Others (%)	0.26	0.25	0.18	0.34	0.22	0.27	0.48
Hispanic (%)	0.79	0.73	0.40	0.93	0.84	0.78	1.17
Color (%)	2.93	4.06	1.40	7.16	8.20	5.08	3.71
Female (%)	51.08	51.68	50.13	51.19	52.49	51.26	51.64
Elderly (65 + years) (%)	10.29	14.19	13.74	12.00	16.72	12.88	15.83
Kid (< 5 years) (%)	8.79	8.56	8.74	8.29	8.86	8.55	8.41
Native-born (%)	98.32	98.51	99.31	96.73	99.37	97.99	98.53
Renter housing units (%)	27.88	28.05	21.76	38.08	26.53	30.86	27.31
Education (%)	24.31	17.43	15.93	27.42	10.30	21.33	15.98
Unemployment (%)	4.77	6.26	4.56	4.34	5.73	4.99	4.44
Poverty (%)	6.15	11.26	8.76	16.43	16.17	12.45	11.29
Mean household income ($)	64,629	59,144	56,997	54,324	43,093	56,429	51,501
Year 2000							
Total population	90,277	114,979	72,354	186,824	46,027	510,461	2,415,863
White	85,844	107,818	70,570	168,664	41,008	473,904	2,275,833
Black	1,314	3,197	579	8,230	3,678	16,998	42,760
Asian	1,439	1,308	413	4,945	222	8,327	27,651
Native American	154	268	148	281	99	950	8,313
Others	1,520	2,392	649	4,701	1,020	10,282	61,306
Hispanic	1,414	1,461	708	4,204	1,076	8,863	72,638
Color	5,260	7,901	2,253	20,135	5,477	41,026	172,272
White (%)	95.09	93.77	97.53	90.28	89.10	92.84	94.20
Black (%)	1.46	2.78	0.80	4.41	7.99	3.33	1.77
Asian (%)	1.59	1.14	0.57	2.65	0.48	1.63	1.14
Native American (%)	0.17	0.23	0.20	0.15	0.22	0.19	0.34
Others (%)	1.68	2.08	0.90	2.52	2.22	2.01	2.54
Hispanic (%)	1.57	1.27	0.98	2.25	2.34	1.74	3.01
Color (%)	5.83	6.87	3.11	10.78	11.90	8.04	7.13
Female (%)	50.58	50.85	49.45	50.91	51.65	50.70	51.04
Elderly (65 + years) (%)	11.06	13.60	12.66	12.01	15.76	12.63	15.39
Kid (< 5 years) (%)	8.73	8.04	7.80	7.14	8.49	7.84	7.73
Native-born (%)	97.19	97.91	98.57	94.72	98.18	96.73	96.92
Renter housing units (%)	24.75	25.96	19.09	36.47	25.05	28.60	25.20
College degree or higher (%)	30.93	22.61	22.16	31.56	13.63	26.36	20.15
Unemployment (%)	2.81	4.06	3.83	4.03	4.88	3.85	4.25
Poverty (%)	4.50	8.06	5.36	13.97	12.80	9.61	9.03
Mean household income ($)	74,393	66,328	71,347	59,890	52,523	64,832	60,361
Year 2010							
Total population	95,814	126,017	80,322	194,292	47,275	543,720	2,472,547
White	87,913	115,401	76,896	169,723	41,260	491,193	2,282,217
Black	2,763	5,088	1,110	10,902	3,415	23,278	59,404
Asian	2,385	1,349	894	6,412	522	11,562	39,762
Native American	208	306	147	571	82	1,314	8,511
Others	2,545	3,873	1,275	6,684	1,996	16,373	82,653
Hispanic	2,409	2,752	1,355	7,108	2,208	15,832	121,100
Color	9,183	12,036	4,358	28,005	6,892	60,474	259,124
White (%)	91.75	91.58	95.73	87.35	87.28	90.34	92.30

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	2.88	4.04	1.38	5.61	7.22	4.28	2.40
Asian (%)	2.49	1.07	1.11	3.30	1.10	2.13	1.61
Native American (%)	0.22	0.24	0.18	0.29	0.17	0.24	0.34
Others (%)	2.66	3.07	1.59	3.44	4.22	3.01	3.34
Hispanic (%)	2.51	2.18	1.69	3.66	4.67	2.91	4.90
Color (%)	9.58	9.55	5.43	14.41	14.58	11.12	10.48
Female (%)	50.94	50.39	50.06	50.62	52.25	50.68	50.62
Elderly (65 + years) (%)	12.32	13.38	13.03	11.81	15.80	12.79	15.25
Kid (< 5 years) (%)	6.50	6.89	6.79	6.14	6.87	6.54	6.57
Native-born (%)	96.80	97.63	97.99	93.62	96.52	96.01	95.84
Renter housing units (%)	24.20	25.15	17.72	33.91	24.68	27.01	24.03
College degree or higher (%)	32.74	25.13	29.23	33.28	17.39	29.22	23.51
Unemployment (%)	4.98	5.08	3.50	5.23	5.86	4.95	5.35
Poverty (%)	7.50	10.89	6.60	17.73	12.70	12.22	11.46
Mean household income ($)	73,105	63,563	72,294	59,068	53,298	64,054	61,340
Index	19	19	19	19	19	19	19

Table B. 38

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Duane Arnold Energy Center, Iowa

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	825	1.34	696	92.34	129	88.99	3.348*	(2.51)
Black	825	1.08	696	2.35	129	5.78	-3.429**	(-3.16)
Asian	825	0.27	696	1.42	129	1.77	-0.346	(-1.26)
Native American	825	0.07	696	0.36	129	0.27	0.087	(1.20)
Others	825	0.34	696	3.24	129	3.19	0.0533	(0.16)
Hispanic	825	0.42	696	4.65	129	3.08	1.566***	(3.69)
Color	825	1.43	696	10.01	129	12.51	-2.494	(-1.75)
White (2000)	825	1.24	696	94.19	129	91.51	2.679*	(2.15)
Black	825	1.08	696	1.79	129	4.70	-2.910**	(-2.69)
Asian	825	0.23	696	1.10	129	1.48	-0.386	(-1.71)
Native American	825	0.04	696	0.34	129	0.17	0.165***	(3.86)
Others	825	0.23	696	2.43	129	2.12	0.311	(1.38)
Hispanic	825	0.26	696	2.87	129	1.90	0.970***	(3.72)
Color	825	1.27	696	6.94	129	9.42	-2.474	(-1.94)
White (1990)	825	1.08	696	96.96	129	94.44	2.523*	(2.33)
Black	825	1.04	696	1.51	129	4.00	-2.495*	(-2.41)
Asian	825	0.24	696	0.77	129	1.11	-0.343	(-1.43)
Native American	825	0.05	696	0.31	129	0.16	0.142**	(2.93)
Others	825	0.05	696	0.46	129	0.29	0.174**	(3.19)
Hispanic	825	0.09	696	1.14	129	0.76	0.384***	(4.06)
Color	825	1.09	696	3.70	129	6.05	-2.353*	(-2.16)

*p<0.05, **p<0.01, ***p<0.001

20. Wolf Creek Generating Station, Kansas

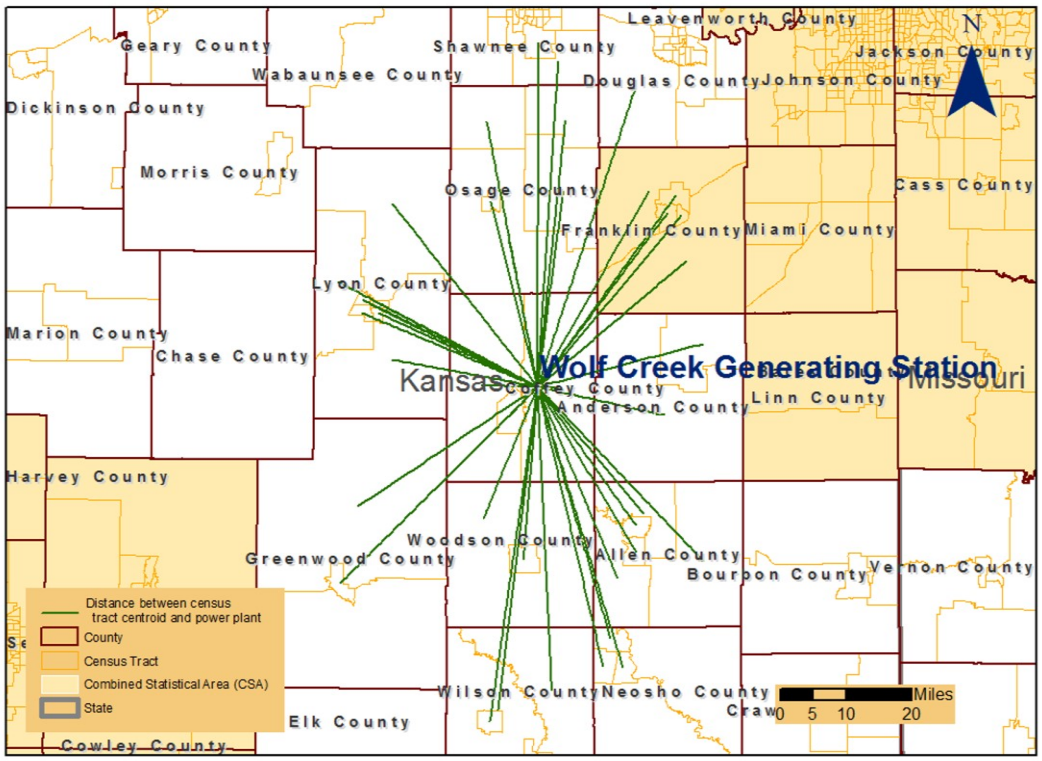

Figure B. 20 Distance to census-tract center points of census tracts within a 50-mile radius of Wolf Creek Generating Station, Kansas in 1990, 2000, and 2010

Table B. 39

Demographic Composition of Population, as sorted by Distance from Wolf Creek Generating Station, Kansas in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	3	1	14	11	10	39	731
Tract area (sq. mile)	654	452	1,774	1,996	1,096	5,973	76,306
Total population	8,404	3,028	51,599	39,484	31,274	133,789	2,343,798
White	8,330	2,999	48,322	38,212	30,382	128,245	2,105,651
Black	11	7	894	369	236	1,517	140,440
Asian	2	0	728	215	51	996	30,120
Native American	59	21	342	323	300	1,045	22,208
Others	2	0	1,319	361	303	1,985	45,371
Hispanic	38	9	1,976	827	563	3,413	86,881
Color	110	34	3,904	1,670	1,142	6,860	276,841
White (%)	99.12	99.04	93.65	96.78	97.15	95.86	89.84
Black (%)	0.13	0.23	1.73	0.93	0.75	1.13	5.99
Asian (%)	0.02	0.00	1.41	0.54	0.16	0.74	1.29
Native American (%)	0.70	0.69	0.66	0.82	0.96	0.78	0.95
Others (%)	0.02	0.00	2.56	0.91	0.97	1.48	1.94
Hispanic (%)	0.45	0.30	3.83	2.09	1.80	2.55	3.71
Color (%)	1.31	1.12	7.57	4.23	3.65	5.13	11.81
Female (%)	50.51	50.59	51.28	51.56	51.67	51.39	50.94
Elderly (65 + years) (%)	19.61	16.88	15.79	17.35	17.87	17.00	13.64
Kid (< 5 years) (%)	8.67	8.72	8.99	9.20	7.79	8.75	9.18
Native-born (%)	99.80	99.60	97.70	98.82	99.41	98.61	97.40
Renter housing units (%)	20.26	11.69	29.62	23.62	19.84	24.57	29.28
Education (%)	13.46	6.07	14.00	16.39	12.25	14.07	21.50
Unemployment (%)	5.29	4.64	5.55	4.63	4.78	5.06	4.68
Poverty (%)	8.94	16.69	15.22	10.29	11.45	12.49	11.42
Mean household income ($)	47,226	46,237	42,044	50,760	48,175	46,456	56,668
Year 2000							
Total population	8,865	3,072	53,774	42,012	33,274	140,997	2,547,421
White	8,521	3,002	47,328	40,169	31,879	130,899	2,181,220
Black	22	5	975	361	237	1,600	148,984
Asian	70	0	444	153	120	787	45,193
Native American	80	27	377	301	185	970	23,753
Others	172	35	4,656	1,024	847	6,734	148,278
Hispanic	122	32	5,967	1,240	686	8,047	178,252
Color	398	90	8,620	2,568	1,783	13,459	440,471
White (%)	96.12	97.72	88.01	95.61	95.81	92.84	85.62
Black (%)	0.25	0.16	1.81	0.86	0.71	1.13	5.85
Asian (%)	0.79	0.00	0.83	0.36	0.36	0.56	1.77
Native American (%)	0.90	0.88	0.70	0.72	0.56	0.69	0.93
Others (%)	1.94	1.14	8.66	2.44	2.55	4.78	5.82
Hispanic (%)	1.38	1.04	11.10	2.95	2.06	5.71	7.00
Color (%)	4.49	2.93	16.03	6.11	5.36	9.55	17.29
Female (%)	50.98	49.67	50.51	50.61	50.97	50.66	50.61
Elderly (65 + years) (%)	16.29	16.93	14.14	15.91	16.08	15.32	13.11
Kid (< 5 years) (%)	7.22	8.01	8.33	7.62	7.03	7.73	8.44
Native-born (%)	99.21	99.77	94.20	98.23	99.28	97.04	94.87
Renter housing units (%)	19.56	12.41	29.61	23.73	18.70	24.23	28.43
College degree or higher (%)	20.11	7.76	16.20	20.51	16.91	17.77	26.25
Unemployment (%)	4.44	5.59	5.79	3.02	4.40	4.54	4.23
Poverty (%)	6.61	14.90	14.79	8.33	9.42	11.06	9.83
Mean household income ($)	57,364	43,779	48,027	55,755	59,166	53,502	65,521
Year 2010							
Total population	8,587	2,978	50,347	43,830	32,722	138,464	2,670,865
White	8,291	2,924	45,173	41,125	30,724	128,237	2,263,549
Black	60	0	919	375	410	1,764	160,004
Asian	11	3	883	161	135	1,193	66,551
Native American	20	4	140	135	218	517	23,905
Others	205	47	3,232	2,034	1,235	6,753	156,856
Hispanic	146	0	6,116	2,551	1,116	9,929	266,179
Color	410	54	9,338	4,151	2,887	16,840	571,537
White (%)	96.55	98.19	89.72	93.83	93.89	92.61	84.75

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	0.70	0.00	1.83	0.86	1.25	1.27	5.99
Asian (%)	0.13	0.10	1.75	0.37	0.41	0.86	2.49
Native American (%)	0.23	0.13	0.28	0.31	0.67	0.37	0.90
Others (%)	2.39	1.58	6.42	4.64	3.77	4.88	5.87
Hispanic (%)	1.70	0.00	12.15	5.82	3.41	7.17	9.97
Color (%)	4.77	1.81	18.55	9.47	8.82	12.16	21.40
Female (%)	50.22	50.20	50.30	50.78	51.64	50.76	50.47
Elderly (65 + years) (%)	16.75	15.51	14.35	15.35	16.72	15.40	12.97
Kid (< 5 years) (%)	5.69	5.71	6.79	6.76	6.36	6.59	7.12
Native-born (%)	99.10	99.66	93.10	98.00	98.68	96.48	93.55
Renter housing units (%)	20.07	18.17	28.18	24.73	18.05	24.02	27.72
College degree or higher (%)	19.98	11.92	17.69	22.44	21.77	20.23	29.83
Unemployment (%)	4.06	6.07	6.77	5.91	7.54	6.50	5.98
Poverty (%)	11.47	9.04	19.85	9.94	12.78	14.25	12.34
Mean household income ($)	58,379	58,687	46,664	55,506	59,414	53,425	65,608
Index	20	20	20	20	20	20	20

Table B. 40

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Wolf Creek Generating Station, Kansas

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	770	1.20	731	82.49	39	93.70	-11.21***	(-9.38)
Black	770	0.57	731	6.99	39	1.02	5.978***	(10.47)
Asian	770	0.33	731	2.25	39	0.73	1.515***	(4.64)
Native American	770	0.09	731	0.90	39	0.32	0.581***	(6.14)
Others	770	0.61	731	5.86	39	4.23	1.634**	(2.68)
Hispanic	770	1.53	731	10.04	39	5.77	4.266**	(2.79)
Color	770	1.95	731	22.18	39	10.27	11.92***	(6.12)
White (2000)	770	1.32	731	84.23	39	93.84	-9.618***	(-7.26)
Black	770	0.59	731	6.76	39	1.01	5.750***	(9.71)
Asian	770	0.14	731	1.69	39	0.49	1.199***	(8.32)
Native American	770	0.10	731	0.94	39	0.68	0.258*	(2.63)
Others	770	0.94	731	5.81	39	3.97	1.842	(1.96)
Hispanic	770	1.30	731	6.87	39	4.50	2.369	(1.83)
Color	770	1.70	731	17.92	39	8.06	9.860***	(5.82)
White (1990)	770	0.88	731	89.47	39	96.45	-6.976***	(-7.96)
Black	770	0.59	731	6.14	39	0.97	5.172***	(8.77)
Asian	770	0.19	731	1.17	39	0.54	0.624**	(3.37)
Native American	770	0.10	731	0.91	39	0.83	0.0875	(0.85)
Others	770	0.36	731	1.77	39	1.21	0.557	(1.56)
Hispanic	770	0.52	731	3.46	39	2.13	1.331*	(2.56)
Color	770	0.94	731	11.56	39	4.37	7.188***	(7.62)

*p<0.05, **p<0.01, ***p<0.001

21. River Bend Station, Louisiana

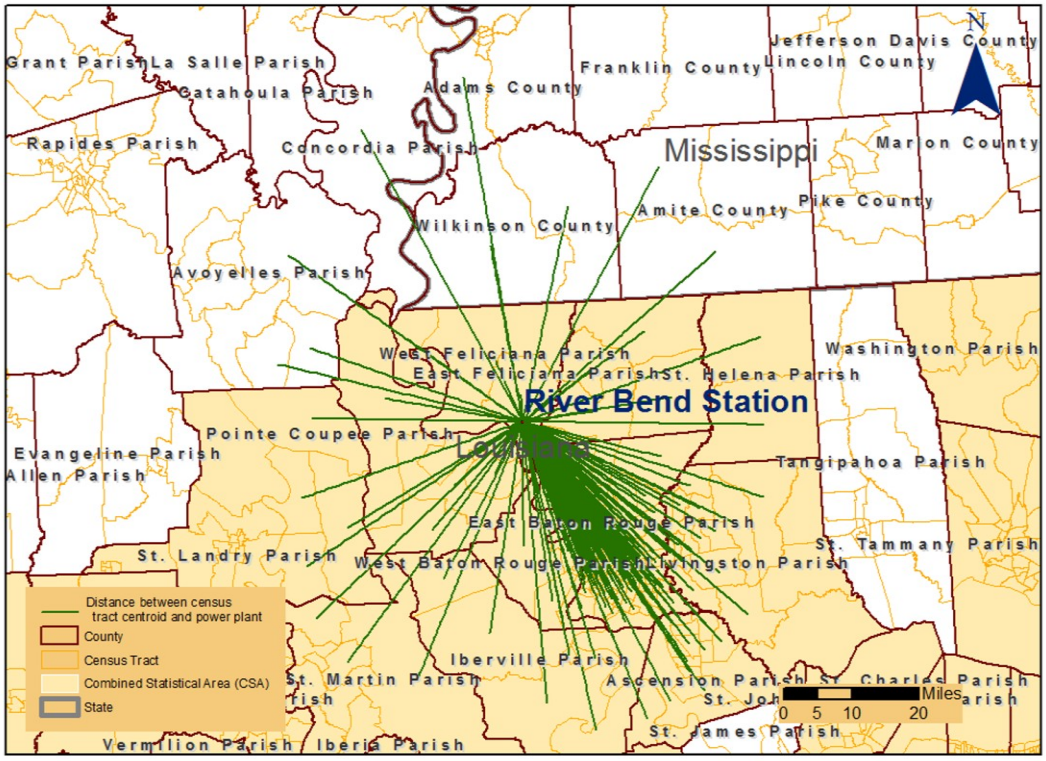

Figure B. 21 Distance to census-tract center points of census tracts within a 50-mile radius of River Bend Station, Louisiana in 1990, 2000, and 2010

Table B. 41

Demographic Composition of Population, as sorted by Distance from River Bend Station, Louisiana in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	5	20	79	38	19	161	1,651
Tract area (sq. mile)	239	810	1,545	2,308	1,966	6,869	93,941
Total population	16,273	88,612	319,426	156,491	75,780	656,582	6,136,605
White	8,767	45,501	202,277	118,508	57,002	432,055	4,040,847
Black	7,455	42,749	111,543	36,150	17,981	215,878	1,998,642
Asian	13	151	4,004	1,219	313	5,700	46,681
Native American	32	172	544	313	91	1,152	27,777
Others	5	41	1,058	298	385	1,787	22,669
Hispanic	106	378	4,552	2,522	952	8,510	96,837
Color	7,594	43,373	120,438	40,155	19,451	231,011	2,162,469
White (%)	53.87	51.35	63.33	75.73	75.22	65.80	65.85
Black (%)	45.81	48.24	34.92	23.10	23.73	32.88	32.57
Asian (%)	0.08	0.17	1.25	0.78	0.41	0.87	0.76
Native American (%)	0.20	0.19	0.17	0.20	0.12	0.18	0.45
Others (%)	0.03	0.05	0.33	0.19	0.51	0.27	0.37
Hispanic (%)	0.65	0.43	1.43	1.61	1.26	1.30	1.58
Color (%)	46.67	48.95	37.70	25.66	25.67	35.18	35.24
Female (%)	51.88	50.64	51.42	50.80	51.04	51.13	52.12
Elderly (65 + years) (%)	12.70	8.83	10.48	7.56	9.43	9.50	11.84
Kid (< 5 years) (%)	9.78	9.52	9.00	10.40	10.30	9.57	9.45
Native-born (%)	99.25	99.47	97.70	98.35	99.16	98.30	98.43
Renter housing units (%)	21.57	22.69	35.18	22.75	16.08	28.33	28.27
Education (%)	14.43	13.21	23.71	20.13	6.78	19.33	15.21
Unemployment (%)	10.11	10.78	8.67	7.16	9.50	8.69	9.24
Poverty (%)	31.64	21.85	22.06	18.63	22.07	21.44	24.49
Mean household income ($)	43,827	49,517	53,801	57,401	44,976	52,902	46,170
Year 2000							
Total population	18,311	92,984	340,810	195,870	89,839	737,814	6,575,820
White	10,720	43,256	194,414	145,696	69,082	463,168	4,138,149
Black	7,377	48,128	133,868	44,762	18,486	252,621	2,225,382
Asian	39	447	6,596	2,276	599	9,957	65,300
Native American	32	218	917	684	247	2,098	35,571
Others	139	939	5,012	2,457	1,398	9,945	111,443
Hispanic	184	706	5,708	3,566	1,966	12,130	133,514
Color	7,672	50,016	149,958	52,517	21,789	281,952	2,508,726
White (%)	58.54	46.52	57.04	74.38	76.90	62.78	62.93
Black (%)	40.29	51.76	39.28	22.85	20.58	34.24	33.84
Asian (%)	0.21	0.48	1.94	1.16	0.67	1.35	0.99
Native American (%)	0.17	0.23	0.27	0.35	0.27	0.28	0.54
Others (%)	0.76	1.01	1.47	1.25	1.56	1.35	1.69
Hispanic (%)	1.00	0.76	1.67	1.82	2.19	1.64	2.03
Color (%)	41.90	53.79	44.00	26.81	24.25	38.21	38.15
Female (%)	51.65	50.13	51.33	50.77	50.56	50.94	51.77
Elderly (65 + years) (%)	12.76	10.40	10.81	8.28	8.93	9.91	12.00
Kid (< 5 years) (%)	8.40	8.25	8.10	9.31	9.30	8.60	8.56
Native-born (%)	98.84	99.25	96.61	97.59	98.29	97.47	97.92
Renter housing units (%)	20.20	21.13	35.73	20.05	13.80	26.86	27.31
College degree or higher (%)	17.59	14.70	26.43	23.46	9.62	21.90	17.59
Unemployment (%)	6.48	7.97	6.65	4.98	6.28	6.31	7.47
Poverty (%)	20.68	19.06	19.97	13.56	16.26	17.69	19.98
Mean household income ($)	59,551	54,976	59,157	66,307	55,222	60,088	54,041
Year 2010							
Total population	18,786	96,927	357,465	232,127	109,517	814,822	6,557,109
White	11,393	40,274	188,276	170,165	81,788	491,896	4,089,088
Black	7,162	54,179	153,312	53,841	24,051	292,545	2,201,410
Asian	0	634	8,892	3,462	688	13,676	80,277
Native American	102	146	666	599	429	1,942	39,020
Others	129	1,694	6,319	4,060	2,561	14,763	147,314
Hispanic	185	1,113	10,586	8,029	4,462	24,375	218,213
Color	7,570	57,006	176,777	67,723	30,399	339,475	2,598,980
White (%)	60.65	41.55	52.67	73.31	74.68	60.37	62.36

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	38.12	55.90	42.89	23.19	21.96	35.90	33.57
Asian (%)	0.00	0.65	2.49	1.49	0.63	1.68	1.22
Native American (%)	0.54	0.15	0.19	0.26	0.39	0.24	0.60
Others (%)	0.69	1.75	1.77	1.75	2.34	1.81	2.25
Hispanic (%)	0.98	1.15	2.96	3.46	4.07	2.99	3.33
Color (%)	40.30	58.81	49.45	29.17	27.76	41.66	39.64
Female (%)	52.88	51.40	51.13	50.97	50.15	51.02	51.29
Elderly (65 + years) (%)	15.09	11.85	10.81	9.84	10.42	10.70	12.49
Kid (< 5 years) (%)	6.58	6.35	6.50	7.53	7.84	6.96	6.97
Native-born (%)	98.62	98.59	95.66	96.54	97.75	96.61	97.05
Renter housing units (%)	19.16	23.15	34.97	21.79	16.54	27.05	26.36
College degree or higher (%)	20.53	17.62	27.62	27.44	16.55	24.70	19.82
Unemployment (%)	6.83	9.89	7.52	5.23	6.92	7.04	8.65
Poverty (%)	19.02	17.10	19.60	13.40	14.88	16.86	19.68
Mean household income ($)	58,682	55,685	60,344	74,007	65,867	64,356	56,114
Index	21	21	21	21	21	21	21

Table B. 42

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding River Bend Station, Louisiana

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	1812	2.60	1651	57.10	161	55.88	1.217	(0.47)
Black	1812	2.62	1651	37.15	161	39.83	-2.686	(-1.03)
Asian	1812	0.31	1651	1.22	161	1.65	-0.427	(-1.36)
Native American	1812	0.07	1651	0.55	161	0.23	0.326***	(4.85)
Others	1812	0.17	1651	2.23	161	1.79	0.435*	(2.59)
Hispanic	1812	0.31	1651	3.47	161	2.86	0.617*	(1.99)
Color	1812	2.56	1651	43.26	161	45.45	-2.185	(-0.85)
White (2000)	1812	2.51	1651	61.00	161	60.68	0.319	(0.13)
Black	1812	2.54	1651	35.59	161	36.27	-0.682	(-0.27)
Asian	1812	0.22	1651	1.01	161	1.44	-0.437*	(-1.99)
Native American	1812	0.06	1651	0.55	161	0.27	0.283***	(4.60)
Others	1812	0.10	1651	1.76	161	1.34	0.418***	(4.02)
Hispanic	1812	0.14	1651	2.12	161	1.61	0.517***	(3.73)
Color	1812	2.49	1651	40.01	161	40.28	-0.271	(-0.11)
White (1990)	1812	2.45	1651	65.85	161	66.32	-0.464	(-0.19)
Black	1812	2.47	1651	32.44	161	32.31	0.123	(0.05)
Asian	1812	0.19	1651	0.75	161	0.91	-0.159	(-0.86)
Native American	1812	0.06	1651	0.45	161	0.18	0.273***	(4.80)
Others	1812	0.05	1651	0.40	161	0.29	0.114*	(2.46)
Hispanic	1812	0.12	1651	1.68	161	1.33	0.350**	(2.84)
Color	1812	2.42	1651	35.17	161	34.70	0.473	(0.20)

*p<0.05, **p<0.01, ***p<0.001

22. Waterford Steam Electric Station, Louisiana

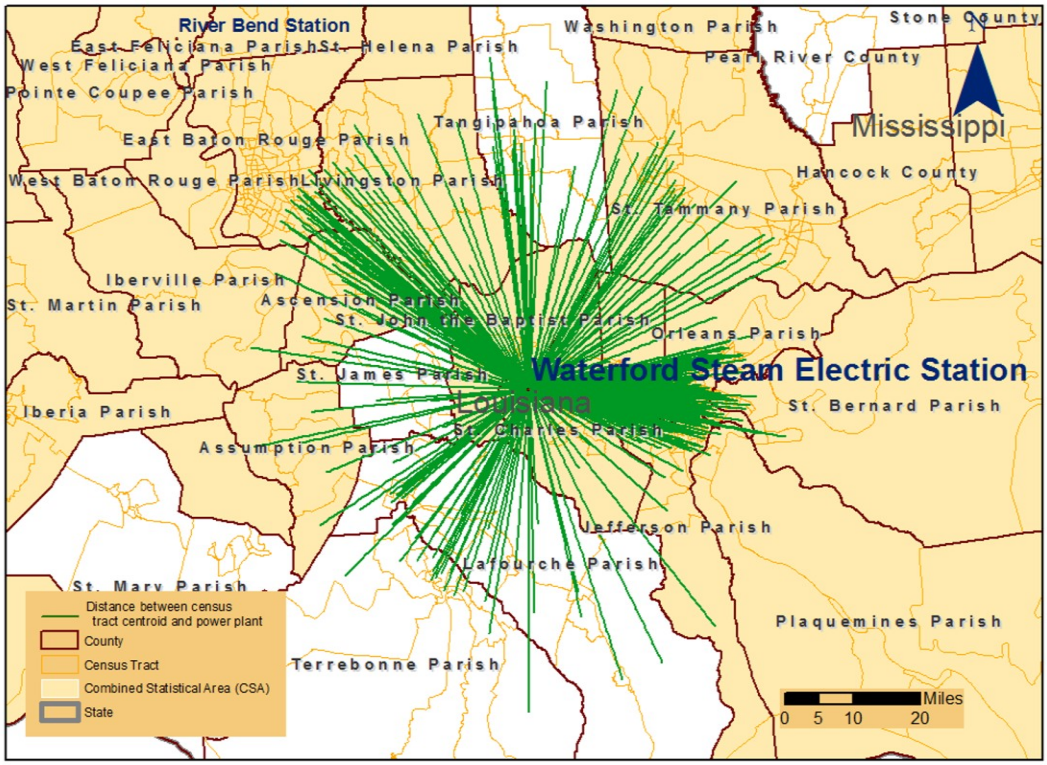

Figure B. 22 Distance to census-tract center points of census tracts within a 50-mile radius of Waterford Steam Electric Station, Louisiana in 1990, 2000, and 2010

Table B. 43

Demographic Composition of Population, as sorted by Distance from Waterford Steam Electric Station, Louisiana in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	18	100	242	80	47	487	661
Tract area (sq. mile)	285	1,096	1,177	1,766	1,944	6,269	46,109
Total population	61,978	333,717	763,682	298,467	197,977	1,655,821	2,564,155
White	40,357	274,614	386,278	226,292	170,125	1,097,666	1,742,354
Black	20,849	48,108	357,404	62,343	24,157	512,861	785,800
Asian	296	5,475	9,836	6,254	1,524	23,385	16,289
Native American	136	749	2,853	2,733	1,459	7,930	12,144
Others	349	4,766	7,301	860	729	14,005	7,539
Hispanic	1,396	19,558	26,034	6,628	3,396	57,012	33,593
Color	22,566	73,483	393,883	77,755	30,459	598,146	845,481
White (%)	65.12	82.29	50.58	75.82	85.93	66.29	67.95
Black (%)	33.64	14.42	46.80	20.89	12.20	30.97	30.65
Asian (%)	0.48	1.64	1.29	2.10	0.77	1.41	0.64
Native American (%)	0.22	0.22	0.37	0.92	0.74	0.48	0.47
Others (%)	0.56	1.43	0.96	0.29	0.37	0.85	0.29
Hispanic (%)	2.25	5.86	3.41	2.22	1.72	3.44	1.31
Color (%)	36.41	22.02	51.58	26.05	15.39	36.12	32.97
Female (%)	51.74	52.18	52.85	51.61	50.68	52.19	51.72
Old (65 + years) (%)	7.31	11.17	11.61	8.56	7.57	10.33	11.56
Kid (< 5 years) (%)	11.75	8.46	9.54	10.40	10.08	9.62	9.64
Native-born (%)	98.36	94.57	96.42	97.67	98.23	96.56	98.81
Renter housing units (%)	19.18	33.05	40.95	23.78	24.57	33.90	27.11
Education (%)	13.01	20.94	18.23	14.47	20.85	18.29	14.70
Unemployment (%)	8.76	6.24	11.10	8.58	6.25	8.89	10.18
Poverty (%)	17.11	12.82	26.88	20.48	15.63	21.13	25.18
Mean household income ($)	55,028	58,954	48,406	51,604	57,855	52,518	45,751
Year 2000							
Total population	67,869	332,732	773,325	361,234	243,092	1,778,252	2,690,724
White	38,815	256,157	345,306	272,187	198,830	1,111,295	1,744,669
Black	27,092	55,593	392,160	71,744	33,852	580,441	864,125
Asian	487	7,807	13,364	7,014	3,393	32,065	24,806
Native American	190	929	3,404	3,386	2,407	10,316	15,517
Others	1,298	12,241	19,082	6,921	4,629	44,171	41,571
Hispanic	1,917	23,706	27,164	8,274	4,915	65,976	41,878
Color	30,064	91,533	442,258	94,042	47,430	705,327	969,301
White (%)	57.19	76.99	44.65	75.35	81.79	62.49	64.84
Black (%)	39.92	16.71	50.71	19.86	13.93	32.64	32.11
Asian (%)	0.72	2.35	1.73	1.94	1.40	1.80	0.92
Native American (%)	0.28	0.28	0.44	0.94	0.99	0.58	0.58
Others (%)	1.91	3.68	2.47	1.92	1.90	2.48	1.54
Hispanic (%)	2.82	7.12	3.51	2.29	2.02	3.71	1.56
Color (%)	44.30	27.51	57.19	26.03	19.51	39.66	36.02
Female (%)	51.71	52.04	52.54	51.57	50.73	51.97	51.47
Old (65 + years) (%)	8.97	13.20	11.16	9.36	8.75	10.77	12.14
Kid (< 5 years) (%)	9.42	7.38	8.44	8.92	8.84	8.43	8.57
Native-born (%)	97.50	92.87	96.05	97.39	97.33	95.96	98.37
Renter housing units (%)	17.56	33.31	39.92	21.67	21.71	31.96	26.66
College degree or higher (%)	14.85	24.28	20.70	19.75	24.23	21.49	16.86
Unemployment (%)	6.65	5.10	8.25	6.09	4.67	6.60	7.83
Poverty (%)	15.44	11.96	23.37	15.13	11.22	17.56	21.03
Mean household income ($)	61,806	66,376	54,632	64,561	68,526	61,006	52,411
Year 2010							
Total population	73,071	323,442	591,275	387,069	281,307	1,656,164	2,773,776
White	38,350	237,178	287,520	291,984	219,223	1,074,255	1,744,819
Black	32,527	63,335	263,676	73,780	48,454	481,772	923,913
Asian	574	8,478	15,003	8,347	5,405	37,807	30,819
Native American	181	1,573	3,806	3,460	2,002	11,022	16,330
Others	1,439	12,878	21,270	9,498	6,223	51,308	57,895
Hispanic	3,236	34,819	34,793	16,044	11,403	100,295	72,459
Color	37,128	110,324	321,320	105,225	70,306	644,303	1,074,365
White (%)	52.48	73.33	48.63	75.43	77.93	64.86	62.90

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	44.51	19.58	44.59	19.06	17.22	29.09	33.31
Asian (%)	0.79	2.62	2.54	2.16	1.92	2.28	1.11
Native American (%)	0.25	0.49	0.64	0.89	0.71	0.67	0.59
Others (%)	1.97	3.98	3.60	2.45	2.21	3.10	2.09
Hispanic (%)	4.43	10.77	5.88	4.14	4.05	6.06	2.61
Color (%)	50.81	34.11	54.34	27.19	24.99	38.90	38.73
Female (%)	51.35	51.57	51.12	50.70	51.19	51.13	51.11
Old (65 + years) (%)	10.40	14.22	10.90	10.76	10.64	11.45	12.53
Kid (< 5 years) (%)	7.37	6.07	6.53	7.51	6.90	6.77	6.95
Native-born (%)	97.42	90.11	94.18	96.47	95.77	94.33	97.70
Renter housing units (%)	18.38	30.61	32.12	21.35	22.60	27.40	27.21
College degree or higher (%)	18.22	26.23	23.21	24.42	26.94	24.53	18.72
Unemployment (%)	7.79	6.65	9.02	6.04	6.08	7.30	8.04
Poverty (%)	14.27	12.27	20.20	13.86	11.87	15.47	19.76
Mean household income ($)	64,391	69,301	60,215	71,477	72,135	66,827	55,925
Index	22	22	22	22	22	22	22

Table B. 44

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Waterford Steam Electric Station, Louisiana

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	1148	1.93	661	58.59	487	56.23	2.362	(1.22)
Black	1148	1.92	661	35.38	487	36.63	-1.247	(-0.65)
Asian	1148	0.26	661	1.01	487	2.19	-1.180***	(-4.61)
Native American	1148	0.10	661	0.58	487	0.56	0.028	(0.29)
Others	1148	0.20	661	2.01	487	2.96	-0.946***	(-4.84)
Hispanic	1148	0.34	661	2.47	487	6.07	-3.599***	(-10.51)
Color	1148	1.86	661	40.53	487	46.19	-5.661**	(-3.04)
White (2000)	1148	1.90	661	63.18	487	59.21	3.972*	(2.09)
Black	1148	1.93	661	33.42	487	36.03	-2.61	(-1.36)
Asian	1148	0.18	661	0.91	487	1.74	-0.832***	(-4.52)
Native American	1148	0.10	661	0.65	487	0.52	0.135	(1.31)
Others	1148	0.12	661	1.57	487	2.50	-0.938***	(-7.80)
Hispanic	1148	0.19	661	1.56	487	3.75	-2.197***	(-11.80)
Color	1148	1.87	661	37.37	487	42.95	-5.588**	(-2.99)
White (1990)	1148	1.86	661	67.82	487	64.74	3.079	(1.66)
Black	1148	1.86	661	30.49	487	32.65	-2.158	(-1.16)
Asian	1148	0.17	661	0.61	487	1.28	-0.670***	(-3.86)
Native American	1148	0.09	661	0.50	487	0.42	0.0862	(0.97)
Others	1148	0.07	661	0.28	487	0.91	-0.633***	(-8.48)
Hispanic	1148	0.18	661	1.33	487	3.54	-2.204***	(-11.99)
Color	1148	1.82	661	32.82	487	37.69	-4.864**	(-2.68)

*p<0.05, **p<0.01, ***p<0.001

23. Calvert Cliffs Nuclear Power Plant, Maryland

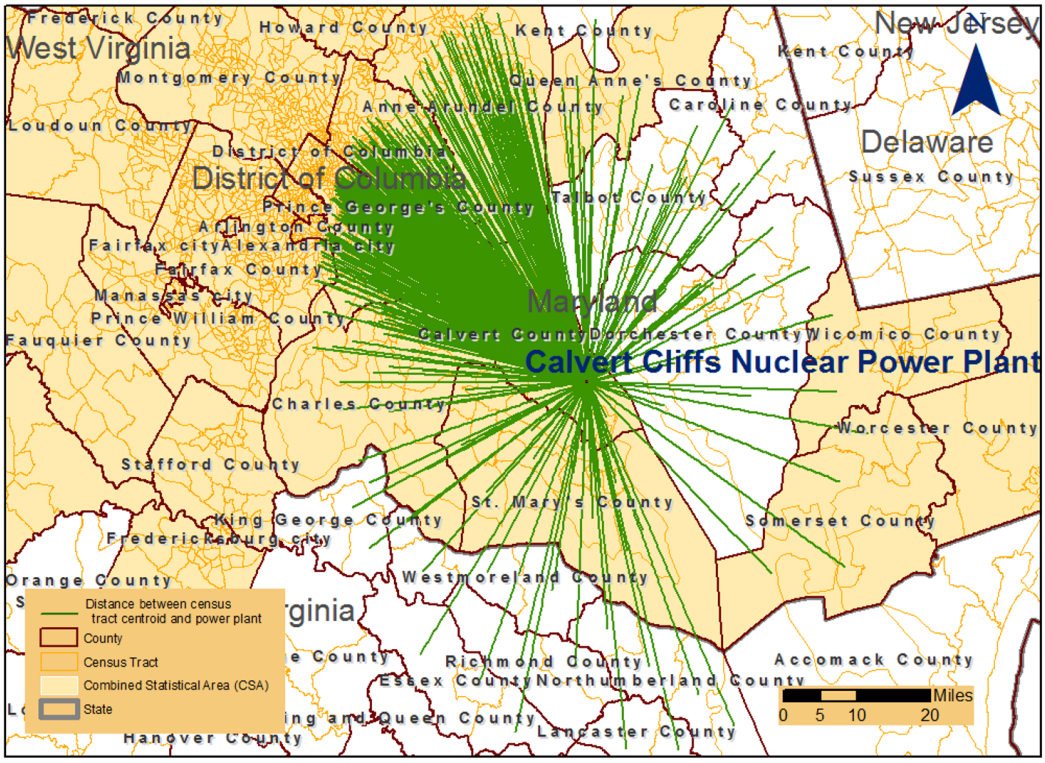

Figure B. 23 Distance to census-tract center points of census tracts within a 50-mile radius of Calvert Cliffs Nuclear Power Plant, Maryland in 1990, 2000, and 2010

Table B. 45

Demographic Composition of Population, as sorted by Distance from Calvert Cliffs Nuclear Power Plant, Maryland in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	10	26	45	152	205	438	3,054
Tract area (sq. mile)	258	907	1,720	2,244	953	6,082	49,167
Total population	33,438	83,023	146,292	507,912	689,904	1,460,569	10,115,140
White	28,854	67,156	116,513	263,709	316,745	792,977	7,576,252
Black	4,261	14,418	27,106	229,112	351,427	626,324	2,125,403
Asian	123	781	1,406	10,206	13,885	26,401	281,292
Native American	134	329	766	2,079	2,023	5,331	26,866
Others	73	312	510	2,824	5,831	9,550	105,271
Hispanic	369	965	2,030	8,148	14,457	25,969	280,745
Color	4,892	16,452	30,948	248,204	379,863	680,359	2,696,288
White (%)	86.29	80.89	79.64	51.92	45.91	54.29	74.90
Black (%)	12.74	17.37	18.53	45.11	50.94	42.88	21.01
Asian (%)	0.37	0.94	0.96	2.01	2.01	1.81	2.78
Native American (%)	0.40	0.40	0.52	0.41	0.29	0.36	0.27
Others (%)	0.22	0.38	0.35	0.56	0.85	0.65	1.04
Hispanic (%)	1.10	1.16	1.39	1.60	2.10	1.78	2.78
Color (%)	14.63	19.82	21.15	48.87	55.06	46.58	26.66
Female (%)	50.31	49.89	50.62	51.92	51.85	51.61	51.30
Old (65 + years) (%)	10.21	8.65	10.18	8.96	9.04	9.13	11.11
Kid (< 5 years) (%)	10.24	10.46	9.19	8.78	9.12	9.11	8.56
Native-born (%)	98.31	98.02	98.15	96.05	95.12	95.99	93.82
Renter housing units (%)	15.45	25.21	22.50	29.94	40.72	33.78	32.80
Education (%)	19.08	15.68	17.18	23.79	25.58	23.43	26.12
Unemployment (%)	3.46	3.80	3.45	3.92	5.85	4.75	4.52
Poverty (%)	5.13	7.55	6.40	5.59	11.14	8.38	9.96
Mean household income ($)	79,006	71,759	77,800	82,773	74,909	77,867	72,122
Year 2000							
Total population	48,206	100,590	168,160	576,295	712,341	1,605,592	11,341,468
White	40,685	79,046	121,814	238,569	307,224	787,338	7,895,918
Black	5,858	16,935	39,155	308,555	359,421	729,924	2,465,540
Asian	335	1,854	2,379	11,437	16,471	32,476	454,384
Native American	123	404	933	2,017	2,090	5,567	34,484
Others	1,215	2,317	3,891	15,744	27,149	50,316	491,113
Hispanic	858	1,622	3,182	13,528	28,757	47,947	551,446
Color	7,931	22,428	48,137	343,484	417,201	839,181	3,698,281
White (%)	84.40	78.58	72.44	41.40	43.13	49.04	69.62
Black (%)	12.15	16.84	23.28	53.54	50.46	45.46	21.74
Asian (%)	0.69	1.84	1.41	1.98	2.31	2.02	4.01
Native American (%)	0.26	0.40	0.55	0.35	0.29	0.35	0.30
Others (%)	2.52	2.30	2.31	2.73	3.81	3.13	4.33
Hispanic (%)	1.78	1.61	1.89	2.35	4.04	2.99	4.86
Color (%)	16.45	22.30	28.63	59.60	58.57	52.27	32.61
Female (%)	50.02	50.05	51.33	52.49	52.20	52.01	51.31
Old (65 + years) (%)	9.88	9.08	10.88	9.82	10.18	10.05	11.44
Kid (< 5 years) (%)	8.69	8.43	8.19	8.18	8.56	8.38	7.82
Native-born (%)	97.64	97.37	97.27	95.05	92.12	94.20	90.57
Renter housing units (%)	14.78	23.59	20.31	26.40	36.83	29.98	31.08
College degree or higher (%)	23.27	20.55	21.49	27.35	30.72	27.68	31.13
Unemployment (%)	3.66	3.96	3.73	4.53	6.92	5.41	4.63
Poverty (%)	4.56	7.26	6.63	6.38	13.15	9.40	9.63
Mean household income ($)	85,546	79,782	83,435	87,376	80,277	83,268	79,389
Year 2010							
Total population	48,285	129,775	197,255	603,123	741,007	1,719,445	12,403,132
White	40,337	100,056	122,696	222,718	322,224	808,031	8,290,535
Black	6,042	21,710	63,121	340,523	360,158	791,554	2,714,879
Asian	520	3,147	3,469	14,220	21,726	43,082	707,414
Native American	23	486	725	1,640	1,374	4,248	38,531
Others	1,363	4,376	7,244	24,022	35,525	72,530	651,773
Hispanic	1,656	4,126	7,535	32,128	60,124	105,569	950,644
Color	9,084	32,728	79,157	397,726	453,351	972,046	4,624,980
White (%)	83.54	77.10	62.20	36.93	43.48	46.99	66.84

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	12.51	16.73	32.00	56.46	48.60	46.04	21.89
Asian (%)	1.08	2.42	1.76	2.36	2.93	2.51	5.70
Native American (%)	0.05	0.37	0.37	0.27	0.19	0.25	0.31
Others (%)	2.82	3.37	3.67	3.98	4.79	4.22	5.25
Hispanic (%)	3.43	3.18	3.82	5.33	8.11	6.14	7.66
Color (%)	18.81	25.22	40.13	65.94	61.18	56.53	37.29
Female (%)	51.42	50.04	51.53	52.66	52.23	52.11	51.17
Old (65 + years) (%)	10.91	9.76	11.81	11.67	10.92	11.20	11.94
Kid (< 5 years) (%)	6.43	6.46	6.30	6.31	7.12	6.67	6.36
Native-born (%)	97.18	95.85	95.67	92.11	88.36	91.33	87.70
Renter housing units (%)	14.68	21.89	17.88	24.03	33.89	27.27	29.22
College degree or higher (%)	28.94	26.46	27.30	31.36	35.86	32.39	35.62
Unemployment (%)	5.21	4.63	5.80	7.38	8.59	7.45	6.19
Poverty (%)	5.45	6.30	5.84	6.02	12.20	8.66	10.10
Mean household income ($)	97,216	96,429	94,526	94,529	89,320	92,445	85,728
Index	23	23	23	23	23	23	23

Table B. 46

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Calvert Cliffs Nuclear Power Plant, Maryland

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	3492	1.75	3054	65.18	438	42.46	22.71***	(12.98)
Black	3492	1.77	3054	22.94	438	48.81	-25.87***	(-14.59)
Asian	3492	0.20	3054	5.32	438	2.28	3.036***	(15.37)
Native American	3492	0.03	3054	0.32	438	0.22	0.103***	(3.39)
Others	3492	0.24	3054	4.97	438	3.95	1.024***	(4.26)
Hispanic	3492	0.45	3054	7.28	438	5.87	1.407**	(3.11)
Color	3492	1.78	3054	37.49	438	58.60	-21.11***	(-11.83)
White (2000)	3492	1.77	3054	68.94	438	46.53	22.42***	(12.66)
Black	3492	1.77	3054	22.56	438	48.11	-25.55***	(-14.41)
Asian	3492	0.16	3054	3.89	438	1.96	1.922***	(12.33)
Native American	3492	0.04	3054	0.35	438	0.34	0.00841	(0.20)
Others	3492	0.19	3054	4.22	438	3.06	1.158***	(6.04)
Hispanic	3492	0.25	3054	4.66	438	2.87	1.788***	(7.06)
Color	3492	1.76	3054	32.93	438	54.69	-21.75***	(-12.36)
White (1990)	3492	1.71	3054	75.64	438	54.47	21.16***	(12.34)
Black	3492	1.73	3054	20.12	438	42.82	-22.70***	(-13.15)
Asian	3492	0.14	3054	2.77	438	1.73	1.031***	(7.16)
Native American	3492	0.04	3054	0.31	438	0.35	-0.0408	(-0.95)
Others	3492	0.08	3054	1.05	438	0.61	0.438***	(5.61)
Hispanic	3492	0.12	3054	2.73	438	1.69	1.036***	(8.33)
Color	3492	1.70	3054	25.53	438	46.36	-20.84***	(-12.26)

*p<0.05, **p<0.01, ***p<0.001

24. Pilgrim Nuclear Power Station, Massachusetts

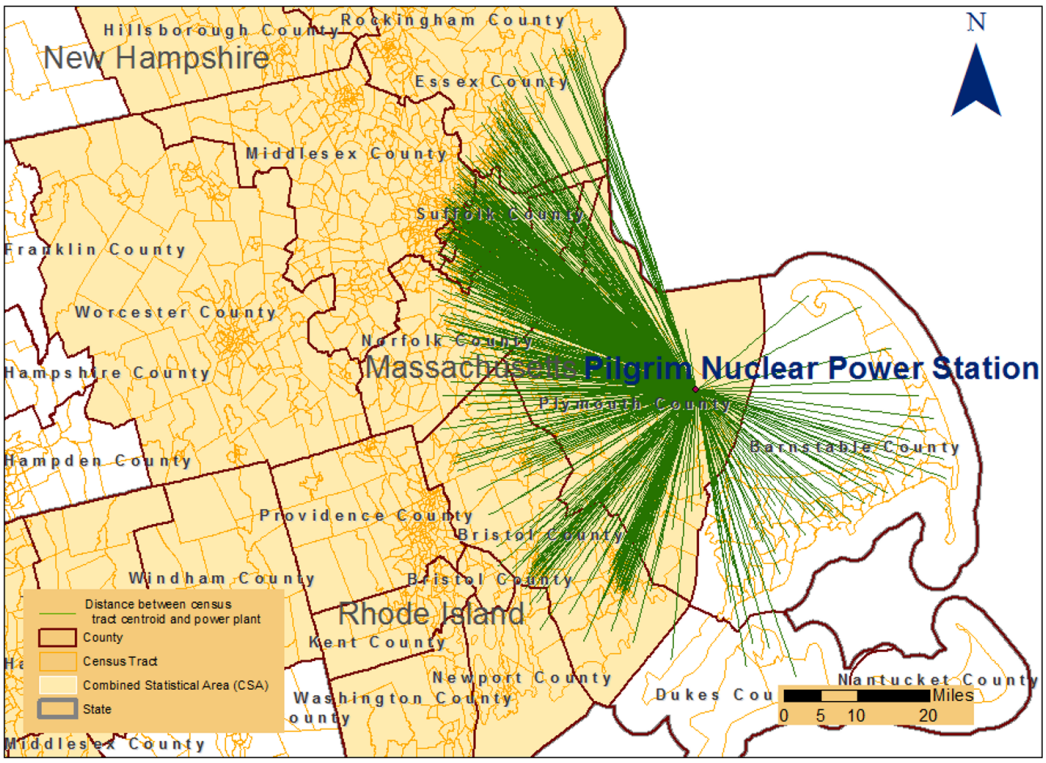

Figure B. 24 Distance to census-tract center points of census tracts within a 50-mile radius of Pilgrim Nuclear Power Station, Massachusetts in 1990, 2000, and 2010

Table B. 47

Demographic Composition of Population, as sorted by Distance from Pilgrim Nuclear Power Station, Massachusetts in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	15	50	187	332	163	747	975
Tract area (sq. mile)	453	539	1,710	1,222	470	4,394	7,705
Total population	59,169	208,525	750,365	1,188,509	701,079	2,907,647	4,112,244
White	57,619	201,256	698,882	943,095	632,029	2,532,881	3,797,948
Black	811	2,846	25,199	156,125	31,051	216,032	118,952
Asian	274	1,191	7,875	44,492	24,456	78,288	80,075
Native American	104	511	2,124	3,011	1,387	7,137	9,710
Others	359	2,710	16,291	41,801	12,138	73,299	105,539
Hispanic	626	2,506	17,890	75,151	30,322	126,495	193,291
Color	1,996	8,929	62,260	275,155	84,735	433,075	396,824
White (%)	97.38	96.51	93.14	79.35	90.15	87.11	92.36
Black (%)	1.37	1.36	3.36	13.14	4.43	7.43	2.89
Asian (%)	0.46	0.57	1.05	3.74	3.49	2.69	1.95
Native American (%)	0.18	0.25	0.28	0.25	0.20	0.25	0.24
Others (%)	0.61	1.30	2.17	3.52	1.73	2.52	2.57
Hispanic (%)	1.06	1.20	2.38	6.32	4.33	4.35	4.70
Color (%)	3.37	4.28	8.30	23.15	12.09	14.89	9.65
Female (%)	51.08	50.53	52.38	52.32	52.75	52.29	51.84
Old (65 + years) (%)	12.51	11.12	15.39	13.82	14.45	14.16	13.60
Kid (< 5 years) (%)	8.57	9.23	8.27	7.60	7.06	7.78	8.38
Native-born (%)	97.01	97.06	91.29	84.78	86.08	87.90	92.29
Renter housing units (%)	21.03	17.10	28.72	47.90	49.74	40.59	34.25
Education (%)	26.33	22.91	20.77	28.34	29.29	26.20	26.51
Unemployment (%)	6.43	6.59	7.67	7.41	6.30	7.12	6.41
Poverty (%)	5.06	4.65	8.32	12.37	9.78	9.99	8.35
Mean household income ($)	81,690	78,555	68,836	69,897	70,109	70,453	75,141
Year 2000							
Total population	66,086	240,422	797,241	1,245,095	729,608	3,078,452	4,318,964
White	62,913	228,761	695,065	900,117	597,650	2,484,506	3,771,399
Black	1,216	3,360	36,136	164,871	37,894	243,477	138,916
Asian	511	1,103	14,892	73,288	42,926	132,720	131,627
Native American	170	575	2,548	3,986	1,991	9,270	11,159
Others	1,270	6,622	48,596	102,868	49,122	208,478	265,864
Hispanic	1,052	2,640	26,337	114,589	51,723	196,341	321,451
Color	3,714	12,982	114,602	388,475	153,948	673,721	667,906
White (%)	95.20	95.15	87.18	72.29	81.91	80.71	87.32
Black (%)	1.84	1.40	4.53	13.24	5.19	7.91	3.22
Asian (%)	0.77	0.46	1.87	5.89	5.88	4.31	3.05
Native American (%)	0.26	0.24	0.32	0.32	0.27	0.30	0.26
Others (%)	1.92	2.75	6.10	8.26	6.73	6.77	6.16
Hispanic (%)	1.59	1.10	3.30	9.20	7.09	6.38	7.44
Color (%)	5.62	5.40	14.37	31.20	21.10	21.89	15.46
Female (%)	50.80	50.94	52.18	52.04	52.11	51.98	51.76
Old (65 + years) (%)	12.04	11.66	15.82	13.28	13.88	13.93	13.51
Kid (< 5 years) (%)	8.25	8.39	7.35	6.94	6.41	7.06	7.79
Native-born (%)	96.34	97.02	89.91	80.50	81.17	84.73	90.23
Renter housing units (%)	19.20	15.72	27.35	47.42	50.00	39.75	32.92
College degree or higher (%)	32.42	28.93	25.66	34.84	35.21	32.01	32.21
Unemployment (%)	4.16	3.80	4.89	5.81	4.55	5.08	4.44
Poverty (%)	5.12	4.87	8.61	12.91	10.64	10.45	9.18
Mean household income ($)	88,648	87,939	74,599	78,444	77,034	77,983	82,556
Year 2010							
Total population	69,440	253,462	807,574	1,269,310	730,272	3,130,058	4,403,427
White	66,147	240,502	675,606	888,055	574,404	2,444,714	3,711,042
Black	1,030	4,137	69,729	176,485	52,918	304,299	180,086
Asian	636	2,597	21,965	94,481	55,279	174,958	194,577
Native American	88	424	2,102	3,353	1,325	7,292	9,813
Others	1,539	5,802	38,172	106,936	46,346	198,795	307,909
Hispanic	940	4,268	38,503	145,939	77,598	267,248	442,159
Color	3,847	15,811	153,254	439,092	199,623	811,627	889,914
White (%)	95.26	94.89	83.66	69.96	78.66	78.10	84.28

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	1.48	1.63	8.63	13.90	7.25	9.72	4.09
Asian (%)	0.92	1.02	2.72	7.44	7.57	5.59	4.42
Native American (%)	0.13	0.17	0.26	0.26	0.18	0.23	0.22
Others (%)	2.22	2.29	4.73	8.42	6.35	6.35	6.99
Hispanic (%)	1.35	1.68	4.77	11.50	10.63	8.54	10.04
Color (%)	5.54	6.24	18.98	34.59	27.34	25.93	20.21
Female (%)	51.51	50.62	52.20	51.93	51.81	51.86	51.51
Old (65 + years) (%)	14.78	13.20	15.96	12.97	13.20	13.85	13.46
Kid (< 5 years) (%)	5.57	5.62	5.65	5.52	5.31	5.52	5.78
Native-born (%)	95.38	96.43	87.33	78.68	77.04	82.34	88.12
Renter housing units (%)	17.06	12.97	25.54	43.61	46.54	36.53	29.55
College degree or higher (%)	38.47	34.91	30.19	40.59	40.83	37.41	37.02
Unemployment (%)	7.94	6.86	7.84	8.55	7.01	7.85	7.13
Poverty (%)	6.16	5.17	9.70	14.39	12.51	11.80	10.01
Mean household income ($)	99,048	91,855	77,390	83,902	78,785	81,903	85,439
Index	24	24	24	24	24	24	24

Table B. 48

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Pilgrim Nuclear Power Station, Massachusetts

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	1722	1.11	975	83.23	747	75.28	7.947***	(7.16)
Black	1722	0.66	975	4.27	747	10.35	-6.077***	(-9.15)
Asian	1722	0.34	975	4.31	747	5.47	-1.157***	(-3.41)
Native American	1722	0.03	975	0.23	747	0.25	-0.019	(-0.63)
Others	1722	0.52	975	7.35	747	7.06	0.297	(0.57)
Hispanic	1722	0.74	975	10.80	747	9.38	1.417	(1.93)
Color	1722	1.20	975	21.00	747	27.36	-6.368***	(-5.31)
White (2000)	1722	1.01	975	86.57	747	79.09	7.477***	(7.43)
Black	1722	0.62	975	3.45	747	8.57	-5.124***	(-8.25)
Asian	1722	0.28	975	3.09	747	4.38	-1.285***	(-4.60)
Native American	1722	0.02	975	0.25	747	0.32	-0.0712**	(-2.95)
Others	1722	0.48	975	6.64	747	7.49	-0.851	(-1.77)
Hispanic	1722	0.62	975	8.11	747	7.24	0.871	(1.41)
Color	1722	1.12	975	16.32	747	23.65	-7.329***	(-6.53)
White (1990)	1722	0.91	975	92.14	747	85.75	6.385***	(7.01)
Black	1722	0.69	975	2.94	747	8.09	-5.149***	(-7.49)
Asian	1722	0.24	975	2.00	747	2.82	-0.820***	(-3.40)
Native American	1722	0.06	975	0.30	747	0.28	0.0136	(0.23)
Others	1722	0.32	975	2.77	747	2.91	-0.143	(-0.44)
Hispanic	1722	0.47	975	5.07	747	4.95	0.124	(0.27)
Color	1722	0.99	975	9.96	747	16.36	-6.404***	(-6.50)

*p<0.05, **p<0.01, ***p<0.001

25. Donald C. Cook Nuclear Power Plant, Michigan

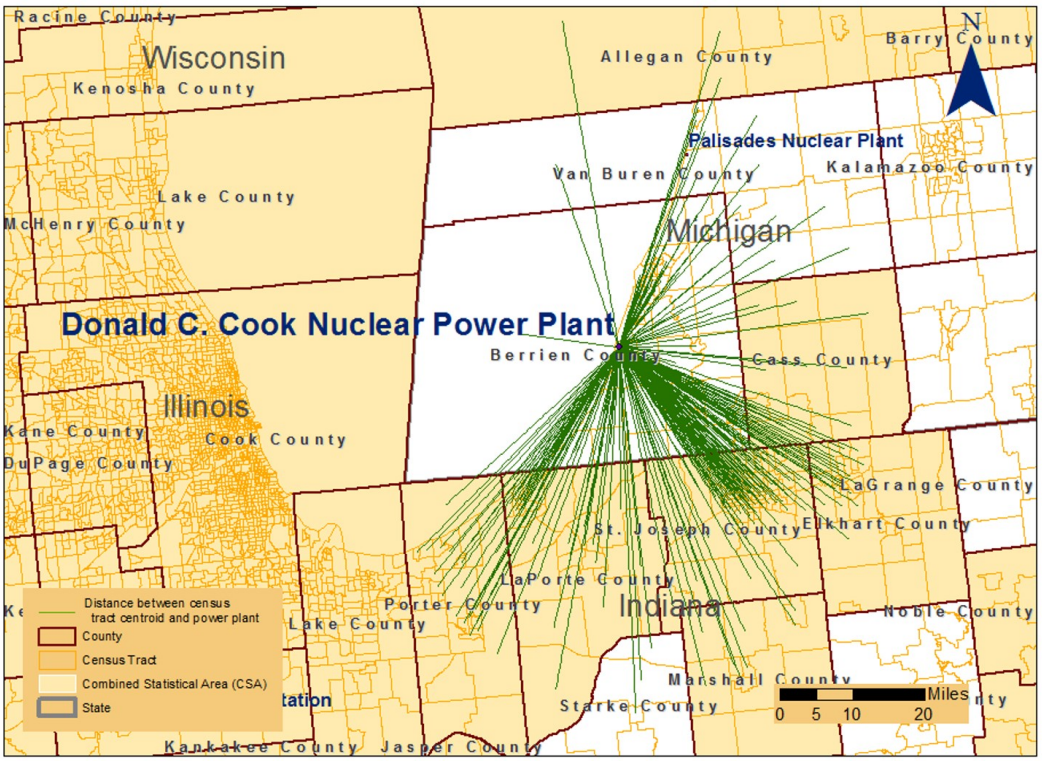

Figure B. 25 Distance to census-tract center points of census tracts within a 50-mile radius of Donald C. Cook Nuclear Power Plant, Michigan in 1990, 2000, and 2010

Table B. 49

Demographic Composition of Population, as sorted by Distance from Donald C. Cook Nuclear Power Plant, Michigan in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	16	29	99	58	25	227	4,097
Tract area (sq. mile)	183	1,396	1,350	1,322	1,602	5,853	127,280
Total population	51,729	92,894	336,028	234,769	94,097	809,517	14,029,827
White	47,625	69,660	291,514	218,719	92,300	719,818	12,061,910
Black	3,217	21,282	36,324	12,332	349	73,504	1,645,230
Asian	415	911	2,654	1,351	405	5,736	133,729
Native American	228	484	1,675	1,055	284	3,726	69,686
Others	242	558	3,864	1,305	767	6,736	119,247
Hispanic	715	1,481	7,428	3,360	1,945	14,929	270,349
Color	4,567	24,109	48,082	18,102	2,988	97,848	2,111,729
White (%)	92.07	74.99	86.75	93.16	98.09	88.92	85.97
Black (%)	6.22	22.91	10.81	5.25	0.37	9.08	11.73
Asian (%)	0.80	0.98	0.79	0.58	0.43	0.71	0.95
Native American (%)	0.44	0.52	0.50	0.45	0.30	0.46	0.50
Others (%)	0.47	0.60	1.15	0.56	0.82	0.83	0.85
Hispanic (%)	1.38	1.59	2.21	1.43	2.07	1.84	1.93
Color (%)	8.83	25.95	14.31	7.71	3.18	12.09	15.05
Female (%)	51.53	52.32	51.44	50.68	51.16	51.29	51.49
Old (65 + years) (%)	14.59	13.27	13.95	12.38	11.66	13.19	12.09
Kid (< 5 years) (%)	8.00	9.47	8.64	8.92	8.33	8.74	8.92
Native-born (%)	95.96	96.72	97.26	98.04	98.13	97.44	96.94
Renter housing units (%)	20.07	32.12	25.73	22.87	24.93	25.18	26.43
Education (%)	23.07	14.44	16.07	14.79	15.23	15.89	16.73
Unemployment (%)	4.51	8.99	6.69	5.50	4.18	6.14	7.36
Poverty (%)	6.53	20.40	11.42	8.89	7.10	10.90	12.29
Mean household income ($)	65,530	48,129	55,111	59,657	61,153	56,980	60,707
Year 2000							
Total population	53,837	91,502	352,593	260,465	103,421	861,818	15,157,111
White	47,338	65,745	288,402	230,900	98,274	730,659	12,547,017
Black	4,383	21,303	41,933	14,403	888	82,910	1,823,262
Asian	726	825	3,897	1,717	751	7,916	228,532
Native American	232	468	1,478	1,060	178	3,416	74,594
Others	1,154	3,164	16,885	12,377	3,339	36,919	483,704
Hispanic	968	3,191	18,086	13,997	5,227	41,469	491,229
Color	6,979	27,345	71,825	34,868	7,995	149,012	2,843,870
White (%)	87.93	71.85	81.79	88.65	95.02	84.78	82.78
Black (%)	8.14	23.28	11.89	5.53	0.86	9.62	12.03
Asian (%)	1.35	0.90	1.11	0.66	0.73	0.92	1.51
Native American (%)	0.43	0.51	0.42	0.41	0.17	0.40	0.49
Others (%)	2.14	3.46	4.79	4.75	3.23	4.28	3.19
Hispanic (%)	1.80	3.49	5.13	5.37	5.05	4.81	3.24
Color (%)	12.96	29.88	20.37	13.39	7.73	17.29	18.76
Female (%)	51.26	51.95	51.21	50.26	50.87	50.96	50.99
Old (65 + years) (%)	15.62	13.65	13.48	12.73	12.01	13.23	12.26
Kid (< 5 years) (%)	6.79	8.62	8.43	8.35	7.81	8.25	8.25
Native-born (%)	94.90	94.87	95.65	95.85	96.27	95.66	95.56
Renter housing units (%)	17.59	29.20	25.12	22.22	25.08	24.19	24.54
College degree or higher (%)	27.78	16.57	19.55	17.23	19.98	19.13	20.97
Unemployment (%)	3.78	6.66	5.78	4.46	3.92	5.11	5.46
Poverty (%)	6.41	17.38	11.27	8.00	7.13	10.12	10.14
Mean household income ($)	77,581	54,391	61,725	66,732	69,938	64,439	69,314
Year 2010							
Total population	53,507	87,062	350,164	272,079	110,916	873,728	15,496,357
White	46,784	61,852	276,966	238,535	101,458	725,595	12,631,003
Black	4,612	18,965	44,796	15,928	2,018	86,319	1,887,649
Asian	835	1,680	5,462	2,382	1,313	11,672	331,635
Native American	114	540	1,504	1,140	269	3,567	65,422
Others	1,162	4,025	21,436	14,094	5,858	46,575	580,648
Hispanic	920	4,051	27,500	23,200	9,943	65,614	719,270
Color	7,226	27,040	87,212	46,689	14,616	182,783	3,260,870
White (%)	87.44	71.04	79.10	87.67	91.47	83.05	81.51

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	8.62	21.78	12.79	5.85	1.82	9.88	12.18
Asian (%)	1.56	1.93	1.56	0.88	1.18	1.34	2.14
Native American (%)	0.21	0.62	0.43	0.42	0.24	0.41	0.42
Others (%)	2.17	4.62	6.12	5.18	5.28	5.33	3.75
Hispanic (%)	1.72	4.65	7.85	8.53	8.96	7.51	4.64
Color (%)	13.50	31.06	24.91	17.16	13.18	20.92	21.04
Female (%)	50.95	51.34	50.92	50.30	50.76	50.75	50.90
Old (65 + years) (%)	17.24	14.80	13.27	13.37	12.70	13.62	12.99
Kid (< 5 years) (%)	4.93	7.16	6.59	6.94	6.83	6.69	6.39
Native-born (%)	94.45	94.38	94.47	94.70	95.73	94.69	94.64
Renter housing units (%)	16.06	26.68	23.67	20.87	23.10	22.54	23.20
College degree or higher (%)	32.49	19.90	21.45	19.87	22.27	21.63	24.14
Unemployment (%)	7.35	11.87	10.39	9.21	6.76	9.49	10.31
Poverty (%)	7.33	22.06	16.58	12.51	11.80	14.66	14.32
Mean household income ($)	72,172	52,262	56,423	61,769	64,423	59,720	62,918
Index	25	25	25	25	25	25	25

Table B. 50

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Donald C. Cook Nuclear Power Plant, Michigan

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	4324	1.71	4097	77.38	227	77.95	-0.564	(-0.33)
Black	4324	1.39	4097	14.99	227	12.61	2.376	(1.71)
Asian	4324	0.16	4097	1.98	227	1.19	0.786***	(5.03)
Native American	4324	0.05	4097	0.44	227	0.41	0.0368	(0.80)
Others	4324	0.37	4097	3.72	227	5.20	-1.480***	(-4.00)
Hispanic	4324	0.57	4097	4.53	227	7.10	-2.568***	(-4.48)
Color	4324	1.59	4097	23.61	227	23.09	0.52	(0.33)
White (2000)	4324	1.64	4097	80.43	227	80.87	-0.444	(-0.27)
Black	4324	1.38	4097	13.33	227	11.80	1.531	(1.11)
Asian	4324	0.10	4097	1.51	227	0.86	0.651***	(6.73)
Native American	4324	0.05	4097	0.57	227	0.38	0.198***	(3.84)
Others	4324	0.32	4097	3.24	227	4.33	-1.088***	(-3.40)
Hispanic	4324	0.45	4097	3.19	227	4.88	-1.683***	(-3.76)
Color	4324	1.52	4097	19.95	227	19.44	0.502	(0.33)
White (1990)	4324	1.58	4097	85.23	227	85.78	-0.549	(-0.35)
Black	4324	1.35	4097	11.51	227	10.43	1.076	(0.80)
Asian	4324	0.11	4097	0.94	227	0.71	0.236*	(2.14)
Native American	4324	0.04	4097	0.53	227	0.43	0.0983*	(2.20)
Others	4324	0.12	4097	0.85	227	0.89	-0.0382	(-0.32)
Hispanic	4324	0.17	4097	1.88	227	1.89	-0.0101	(-0.06)
Color	4324	1.38	4097	14.69	227	13.45	1.243	(0.90)

*p<0.05, **p<0.01, ***p<0.001

26. Fermi, Michigan

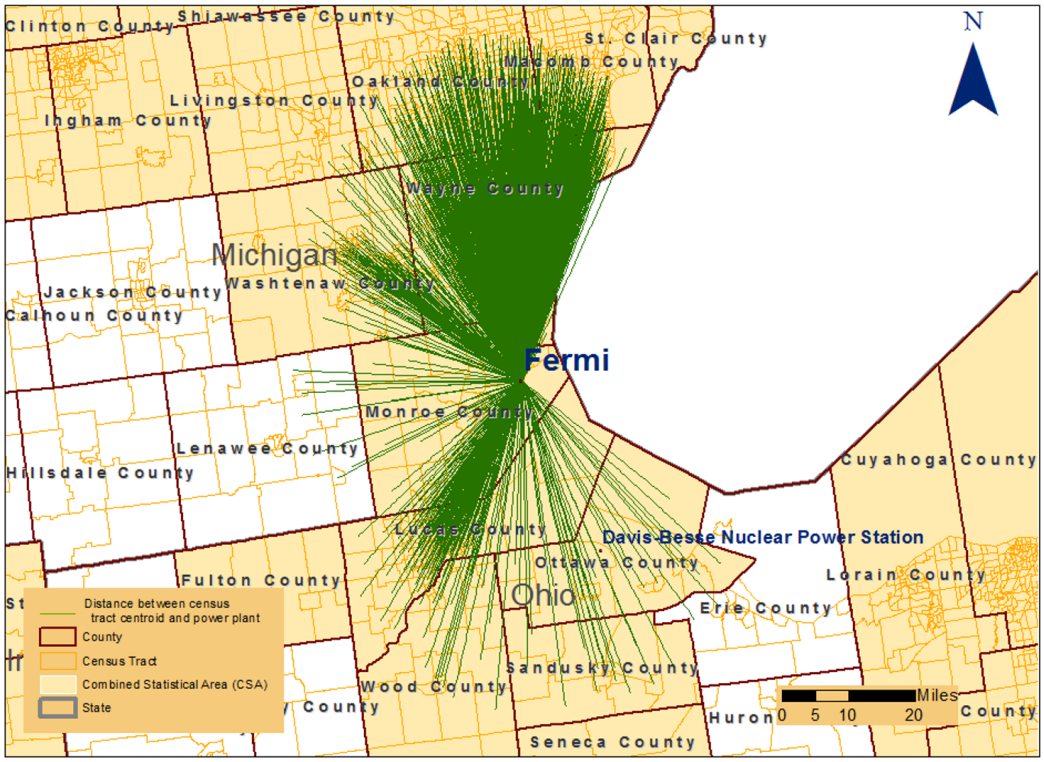

Figure B. 26 Distance to census-tract center points of census tracts within a 50-mile radius of Fermi, Michigan in 1990, 2000, and 2010

Table B. 51
Demographic Composition of Population, as sorted by Distance from Fermi, Michigan in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	24	73	401	510	304	1,312	4,453
Tract area (sq. mile)	268	597	1,148	1,353	1,186	4,552	136,987
Total population	78,888	248,261	1,327,704	1,809,704	1,025,409	4,489,966	15,652,356
White	76,095	235,400	1,034,834	1,036,411	963,855	3,346,595	13,937,582
Black	1,403	7,292	248,652	732,429	32,397	1,022,173	1,419,063
Asian	457	2,963	14,281	28,509	21,279	67,489	124,623
Native American	447	1,389	5,683	5,418	3,260	16,197	65,054
Others	486	1,217	24,239	6,972	4,623	37,537	105,995
Hispanic	1,150	5,517	49,793	21,155	13,959	91,574	230,325
Color	3,418	17,086	317,166	785,641	70,749	1,194,060	1,835,817
White (%)	96.46	94.82	77.94	57.27	94.00	74.53	89.04
Black (%)	1.78	2.94	18.73	40.47	3.16	22.77	9.07
Asian (%)	0.58	1.19	1.08	1.58	2.08	1.50	0.80
Native American (%)	0.57	0.56	0.43	0.30	0.32	0.36	0.42
Others (%)	0.62	0.49	1.83	0.39	0.45	0.84	0.68
Hispanic (%)	1.46	2.22	3.75	1.17	1.36	2.04	1.47
Color (%)	4.33	6.88	23.89	43.41	6.90	26.59	11.73
Female (%)	51.45	51.29	51.73	52.82	51.57	52.11	51.53
Old (65 + years) (%)	10.51	10.80	12.42	12.49	11.94	12.21	12.55
Kid (< 5 years) (%)	9.64	8.67	9.24	9.35	7.99	8.98	8.84
Native-born (%)	97.96	96.17	94.89	94.91	92.87	94.56	97.63
Renter housing units (%)	26.56	26.21	32.87	34.49	22.80	30.81	27.52
Education (%)	9.95	11.47	14.30	20.78	24.52	19.06	16.60
Unemployment (%)	7.53	6.77	9.32	11.08	5.27	8.82	6.94
Poverty (%)	10.79	7.94	15.87	18.61	5.32	14.03	12.45
Mean household income ($)	62,352	67,987	57,573	62,446	86,966	66,870	58,074
Year 2000							
Total population	82,873	253,915	1,335,661	1,795,730	1,074,800	4,542,979	16,748,605
White	78,028	230,699	950,111	928,797	958,790	3,146,425	14,454,440
Black	1,809	12,187	274,917	764,888	45,291	1,099,092	1,590,990
Asian	904	3,206	25,274	48,427	39,750	117,561	194,704
Native American	281	1,099	5,941	5,218	3,104	15,643	72,198
Others	1,857	6,721	79,402	48,435	27,849	164,264	436,267
Hispanic	1,761	6,768	82,990	28,604	21,716	141,839	394,210
Color	6,018	27,347	423,634	880,992	128,772	1,466,763	2,482,414
White (%)	94.15	90.86	71.13	51.72	89.21	69.26	86.30
Black (%)	2.18	4.80	20.58	42.59	4.21	24.19	9.50
Asian (%)	1.09	1.26	1.89	2.70	3.70	2.59	1.16
Native American (%)	0.34	0.43	0.44	0.29	0.29	0.34	0.43
Others (%)	2.24	2.65	5.94	2.70	2.59	3.62	2.60
Hispanic (%)	2.12	2.67	6.21	1.59	2.02	3.12	2.35
Color (%)	7.26	10.77	31.72	49.06	11.98	32.29	14.82
Female (%)	50.56	51.18	51.13	52.39	51.23	51.64	51.12
Old (65 + years) (%)	11.00	12.17	11.99	12.08	13.69	12.42	12.91
Kid (< 5 years) (%)	8.62	7.84	8.90	8.33	7.50	8.28	8.03
Native-born (%)	97.56	96.22	92.13	93.59	89.79	92.48	96.89
Renter housing units (%)	22.85	23.05	31.25	32.06	22.06	28.78	25.57
College degree or higher (%)	12.33	14.83	18.55	26.17	30.79	24.22	20.64
Unemployment (%)	4.04	4.58	6.63	7.42	4.00	6.10	5.15
Poverty (%)	8.68	6.88	14.10	14.94	5.52	11.89	10.20
Mean household income ($)	71,669	75,830	64,286	72,876	93,245	75,436	66,546
Year 2010							
Total population	85,991	260,959	1,282,033	1,651,761	1,087,491	4,368,235	17,096,884
White	79,329	227,803	883,946	846,961	924,248	2,962,287	14,531,779
Black	2,739	19,590	286,121	688,136	79,305	1,075,891	1,716,965
Asian	813	4,921	34,409	67,618	54,853	162,614	271,620
Native American	311	707	5,284	4,136	2,674	13,112	64,175
Others	2,799	7,938	72,273	44,910	26,411	154,331	512,344
Hispanic	3,820	10,636	99,397	35,478	28,598	177,929	578,502
Color	9,645	39,995	448,258	825,355	181,050	1,504,303	2,907,823
White (%)	92.25	87.29	68.95	51.28	84.99	67.81	85.00

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	3.19	7.51	22.32	41.66	7.29	24.63	10.04
Asian (%)	0.95	1.89	2.68	4.09	5.04	3.72	1.59
Native American (%)	0.36	0.27	0.41	0.25	0.25	0.30	0.38
Others (%)	3.25	3.04	5.64	2.72	2.43	3.53	3.00
Hispanic (%)	4.44	4.08	7.75	2.15	2.63	4.07	3.38
Color (%)	11.22	15.33	34.96	49.97	16.65	34.44	17.01
Female (%)	50.95	51.06	51.33	52.19	51.57	51.69	50.92
Old (65 + years) (%)	11.80	13.21	11.59	12.65	14.61	12.84	13.69
Kid (< 5 years) (%)	6.60	5.86	7.13	5.94	5.72	6.24	6.24
Native-born (%)	97.38	95.77	91.08	93.08	88.39	91.57	96.12
Renter housing units (%)	21.89	21.54	29.16	28.53	21.56	26.50	24.44
College degree or higher (%)	15.75	17.73	21.56	29.98	34.33	27.67	23.75
Unemployment (%)	12.01	11.06	13.54	13.95	9.65	12.48	9.31
Poverty (%)	10.97	10.67	18.74	19.35	8.67	15.82	14.13
Mean household income ($)	62,923	64,973	56,406	65,310	80,715	66,641	61,932
Index	26	26	26	26	26	26	26

Table B. 52

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Fermi, Michigan

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	5765	1.06	4453	81.15	1312	62.39	18.76***	(17.67)
Black	5765	1.07	4453	12.62	1312	29.50	-16.88***	(-15.79)
Asian	5765	0.18	4453	1.45	1312	3.33	-1.883***	(-10.68)
Native American	5765	0.03	4453	0.39	1312	0.30	0.0901***	(3.44)
Others	5765	0.16	4453	3.04	1312	3.56	-0.520**	(-3.23)
Hispanic	5765	0.27	4453	3.43	1312	4.21	-0.785**	(-2.94)
Color	5765	1.04	4453	19.52	1312	39.00	-19.48***	(-18.75)
White (2000)	5765	1.07	4453	83.52	1312	66.79	16.73***	(15.69)
Black	5765	1.07	4453	11.19	1312	26.23	-15.04***	(-14.10)
Asian	5765	0.12	4453	1.16	1312	2.50	-1.343***	(-10.86)
Native American	5765	0.04	4453	0.51	1312	0.35	0.160***	(3.98)
Others	5765	0.15	4453	2.76	1312	3.55	-0.791***	(-5.14)
Hispanic	5765	0.20	4453	2.43	1312	3.09	-0.661**	(-3.29)
Color	5765	1.05	4453	16.54	1312	34.12	-17.58***	(-16.77)
White (1990)	5765	1.04	4453	87.58	1312	74.05	13.53***	(13.00)
Black	5765	1.03	4453	9.58	1312	22.69	-13.11***	(-12.69)
Asian	5765	0.08	4453	0.78	1312	1.52	-0.735***	(-9.30)
Native American	5765	0.03	4453	0.45	1312	0.38	0.0758**	(2.83)
Others	5765	0.08	4453	0.72	1312	0.83	-0.11	(-1.33)
Hispanic	5765	0.12	4453	1.52	1312	2.02	-0.507***	(-4.08)
Color	5765	1.02	4453	12.19	1312	26.53	-14.34***	(-14.12)

*p<0.05, **p<0.01, ***p<0.001

27. Palisades Nuclear Plant, Michigan

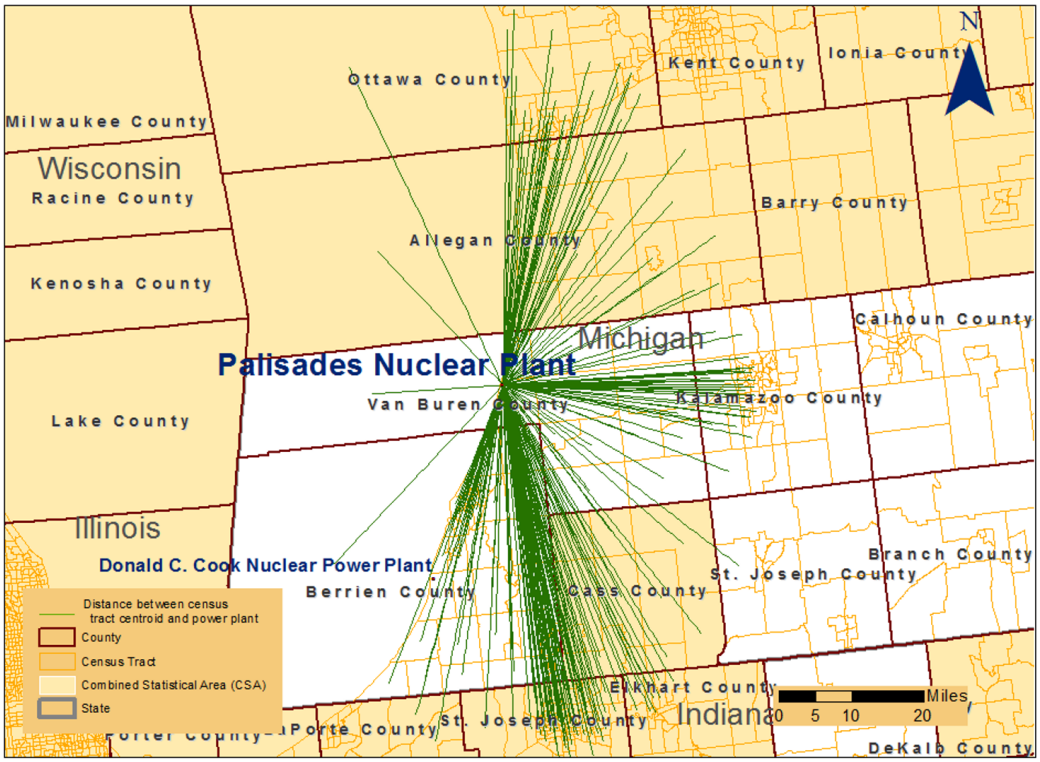

Figure B. 27 Distance to census-tract center points of census tracts within a 50-mile radius of Palisades Nuclear Plant, Michigan in 1990, 2000, and 2010

Table B. 53

Demographic Composition of Population, as sorted by Distance from Palisades Nuclear Plant, Michigan in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	8	23	31	70	94	226	4,098
Tract area (sq. mile)	183	904	1,852	2,037	1,810	6,785	126,348
Total population	34,133	73,590	124,582	263,660	298,779	794,744	14,044,600
White	29,981	50,126	117,323	236,091	268,462	701,983	12,079,745
Black	3,282	21,648	3,627	17,125	24,118	69,800	1,648,934
Asian	120	238	1,343	4,475	2,713	8,889	130,576
Native American	355	511	922	1,100	817	3,705	69,707
Others	396	1,061	1,368	4,881	2,673	10,379	115,604
Hispanic	866	1,755	3,427	9,283	5,736	21,067	264,211
Color	4,603	24,090	9,266	31,926	33,340	103,225	2,106,352
White (%)	87.84	68.12	94.17	89.54	89.85	88.33	86.01
Black (%)	9.62	29.42	2.91	6.50	8.07	8.78	11.74
Asian (%)	0.35	0.32	1.08	1.70	0.91	1.12	0.93
Native American (%)	1.04	0.69	0.74	0.42	0.27	0.47	0.50
Others (%)	1.16	1.44	1.10	1.85	0.89	1.31	0.82
Hispanic (%)	2.54	2.38	2.75	3.52	1.92	2.65	1.88
Color (%)	13.49	32.74	7.44	12.11	11.16	12.99	15.00
Female (%)	51.97	52.34	50.92	51.62	51.37	51.50	51.48
Old (65 + years) (%)	14.01	13.72	11.70	11.45	12.65	12.26	12.14
Kid (< 5 years) (%)	9.32	10.22	9.04	8.87	9.26	9.19	8.89
Native-born (%)	98.11	97.49	96.31	96.16	97.20	96.78	96.98
Renter housing units (%)	22.57	29.10	19.47	28.68	24.21	25.34	26.42
Education (%)	11.48	12.24	19.02	22.37	17.35	18.51	16.58
Unemployment (%)	10.29	11.92	5.70	5.71	5.56	6.33	7.35
Poverty (%)	17.69	24.71	8.72	12.08	8.87	11.79	12.23
Mean household income ($)	48,562	46,222	60,703	61,482	59,214	58,476	60,617
Year 2000							
Total population	34,594	75,167	138,356	297,216	337,253	882,586	15,136,343
White	29,507	48,833	125,892	254,089	286,676	744,997	12,532,679
Black	2,782	21,865	4,489	18,094	30,033	77,263	1,828,909
Asian	234	414	1,593	7,642	4,356	14,239	222,209
Native American	266	416	782	1,473	1,249	4,186	73,824
Others	1,806	3,632	5,598	15,931	14,939	41,906	478,717
Hispanic	2,331	5,015	6,449	18,411	16,461	48,667	484,031
Color	6,075	28,575	15,446	50,823	57,374	158,293	2,834,589
White (%)	85.30	64.97	90.99	85.49	85.00	84.41	82.80
Black (%)	8.04	29.09	3.24	6.09	8.91	8.75	12.08
Asian (%)	0.68	0.55	1.15	2.57	1.29	1.61	1.47
Native American (%)	0.77	0.55	0.57	0.50	0.37	0.47	0.49
Others (%)	5.22	4.83	4.05	5.36	4.43	4.75	3.16
Hispanic (%)	6.74	6.67	4.66	6.19	4.88	5.51	3.20
Color (%)	17.56	38.02	11.16	17.10	17.01	17.94	18.73
Female (%)	51.73	51.05	50.50	51.35	51.24	51.17	50.98
Old (65 + years) (%)	14.38	12.76	12.15	11.85	11.89	12.09	12.32
Kid (< 5 years) (%)	7.86	9.12	7.87	8.36	8.77	8.48	8.24
Native-born (%)	96.31	95.88	94.85	94.64	95.49	95.17	95.59
Renter housing units (%)	20.17	26.86	16.83	27.74	23.50	24.03	24.55
College degree or higher (%)	12.03	14.23	23.19	26.41	21.76	22.47	20.78
Unemployment (%)	6.73	7.58	4.35	5.96	5.15	5.55	5.44
Poverty (%)	12.35	19.52	7.88	10.56	9.21	10.46	10.12
Mean household income ($)	54,881	54,445	72,629	67,498	66,009	66,082	69,223
Year 2010							
Total population	33,432	70,910	144,272	307,925	343,061	899,600	15,470,485
White	27,653	46,185	130,813	257,360	284,755	746,766	12,609,832
Black	2,575	19,388	4,432	19,533	33,182	79,110	1,894,858
Asian	178	473	2,457	9,599	5,582	18,289	325,018
Native American	141	424	621	1,540	1,136	3,862	65,127
Others	2,885	4,440	5,949	19,893	18,406	51,573	575,650
Hispanic	4,704	5,157	6,855	25,218	23,368	65,302	719,582
Color	8,086	26,811	16,906	62,170	70,304	184,277	3,259,376
White (%)	82.71	65.13	90.67	83.58	83.00	83.01	81.51

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	7.70	27.34	3.07	6.34	9.67	8.79	12.25
Asian (%)	0.53	0.67	1.70	3.12	1.63	2.03	2.10
Native American (%)	0.42	0.60	0.43	0.50	0.33	0.43	0.42
Others (%)	8.63	6.26	4.12	6.46	5.37	5.73	3.72
Hispanic (%)	14.07	7.27	4.75	8.19	6.81	7.26	4.65
Color (%)	24.19	37.81	11.72	20.19	20.49	20.48	21.07
Female (%)	51.47	51.13	50.42	51.04	50.98	50.94	50.89
Old (65 + years) (%)	15.42	13.63	13.61	12.55	12.13	12.75	13.04
Kid (< 5 years) (%)	6.50	6.94	5.81	6.59	6.98	6.64	6.39
Native-born (%)	92.75	95.91	94.86	93.89	94.61	94.44	94.66
Renter housing units (%)	18.33	24.20	16.34	26.27	21.41	22.34	23.22
College degree or higher (%)	14.82	17.06	27.43	28.89	23.98	25.28	23.94
Unemployment (%)	10.22	13.00	8.50	10.17	9.06	9.69	10.30
Poverty (%)	18.61	25.65	11.36	15.27	12.91	14.70	14.32
Mean household income ($)	53,186	50,337	66,579	60,247	62,056	60,861	62,857
Index	27	27	27	27	27	27	27

Table B. 54

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Palisades Nuclear Plant, Michigan

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	4324	1.62	4098	77.33	226	78.91	-1.579	(-0.97)
Black	4324	1.38	4098	15.04	226	11.69	3.351*	(2.42)
Asian	4324	0.19	4098	1.95	226	1.66	0.295	(1.55)
Native American	4324	0.05	4098	0.44	226	0.42	0.0235	(0.50)
Others	4324	0.41	4098	3.70	226	5.56	-1.858***	(-4.54)
Hispanic	4324	0.61	4098	4.54	226	7.10	-2.566***	(-4.24)
Color	4324	1.55	4098	23.62	226	22.87	0.757	(0.49)
White (2000)	4324	1.62	4098	80.42	226	80.92	-0.494	(-0.31)
Black	4324	1.37	4098	13.38	226	10.89	2.497	(1.82)
Asian	4324	0.14	4098	1.49	226	1.38	0.104	(0.77)
Native American	4324	0.05	4098	0.57	226	0.43	0.135**	(2.62)
Others	4324	0.34	4098	3.23	226	4.61	-1.387***	(-4.03)
Hispanic	4324	0.50	4098	3.17	226	5.29	-2.116***	(-4.25)
Color	4324	1.49	4098	19.94	226	19.53	0.41	(0.27)
White (1990)	4324	1.56	4098	85.23	226	85.75	-0.524	(-0.34)
Black	4324	1.34	4098	11.54	226	9.76	1.783	(1.33)
Asian	4324	0.13	4098	0.92	226	1.05	-0.124	(-0.98)
Native American	4324	0.04	4098	0.53	226	0.42	0.109*	(2.50)
Others	4324	0.16	4098	0.83	226	1.24	-0.411*	(-2.56)
Hispanic	4324	0.27	4098	1.85	226	2.52	-0.675*	(-2.54)
Color	4324	1.37	4098	14.67	226	13.72	0.955	(0.70)

*p<0.05, **p<0.01, ***p<0.001

28. Monticello Nuclear Generating Plant, Minnesota

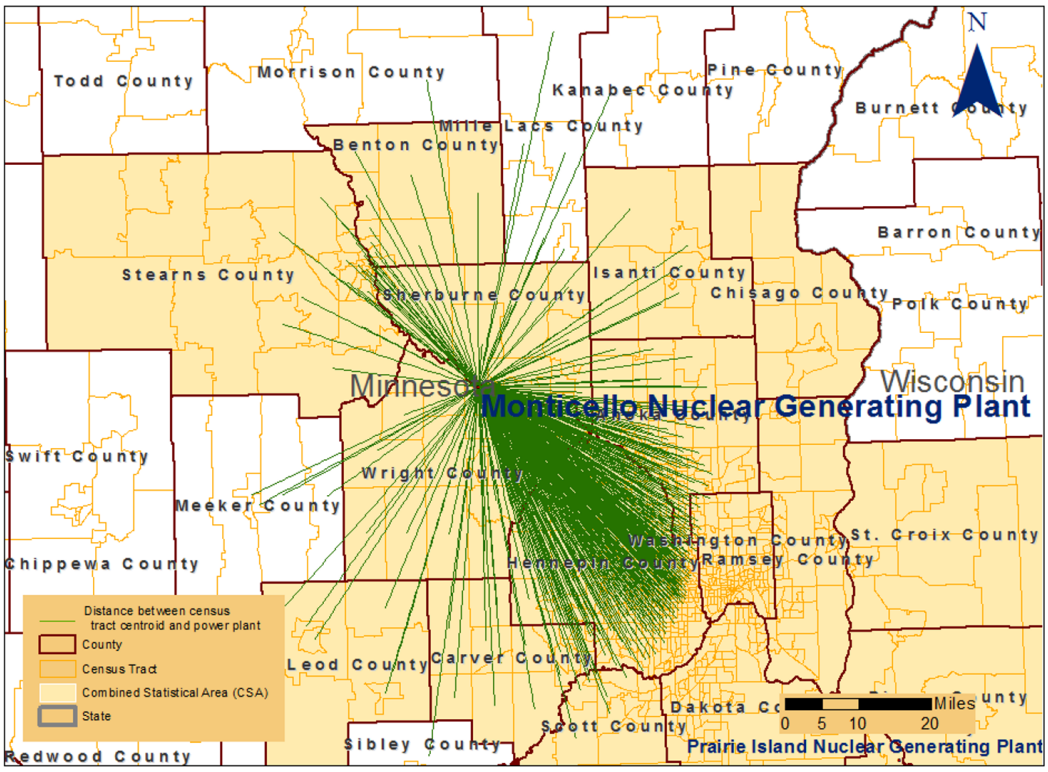

Figure B. 28 Distance to census-tract center points of census tracts within a 50-mile radius of Monticello Nuclear Generating Plant, Minnesota in 1990, 2000, and 2010

Table B. 55

Demographic Composition of Population, as sorted by Distance from Monticello Nuclear Generating Plant, Minnesota in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	8	24	122	245	51	450	888
Tract area (sq. mile)	308	760	1,613	1,377	1,241	5,299	81,637
Total population	28,856	82,718	439,709	807,901	185,450	1,544,634	2,830,480
White	28,631	81,457	426,650	719,344	175,183	1,431,265	2,701,930
Black	42	261	4,947	48,309	5,365	58,924	35,869
Asian	94	356	4,736	23,171	3,307	31,664	45,085
Native American	79	520	2,368	13,003	1,007	16,977	32,523
Others	13	125	1,006	4,034	591	5,769	15,059
Hispanic	188	401	2,974	9,976	1,643	15,182	34,474
Color	386	1,545	15,178	93,784	11,259	122,152	146,780
White (%)	99.22	98.48	97.03	89.04	94.46	92.66	95.46
Black (%)	0.15	0.32	1.13	5.98	2.89	3.81	1.27
Asian (%)	0.33	0.43	1.08	2.87	1.78	2.05	1.59
Native American (%)	0.27	0.63	0.54	1.61	0.54	1.10	1.15
Others (%)	0.05	0.15	0.23	0.50	0.32	0.37	0.53
Hispanic (%)	0.65	0.48	0.68	1.23	0.89	0.98	1.22
Color (%)	1.34	1.87	3.45	11.61	6.07	7.91	5.19
Female (%)	49.66	49.04	50.39	51.30	51.98	50.97	50.98
Old (65 + years) (%)	7.45	7.73	6.65	11.19	12.97	9.86	13.93
Kid (< 5 years) (%)	11.94	10.47	10.59	8.88	8.73	9.49	9.19
Native-born (%)	99.30	99.18	98.50	95.58	97.29	96.88	97.71
Renter housing units (%)	15.57	14.87	23.41	36.35	25.43	30.32	22.45
Education (%)	13.52	14.36	20.86	29.45	30.59	26.32	19.38
Unemployment (%)	5.42	5.56	4.51	5.17	3.68	4.82	5.34
Poverty (%)	7.14	6.15	6.94	10.74	5.43	8.70	11.05
Mean household income ($)	62,847	67,078	73,253	69,922	77,801	71,518	56,617
Year 2000							
Total population	42,437	118,777	540,296	870,778	209,265	1,781,553	3,137,926
White	41,520	115,648	497,519	705,497	187,732	1,547,916	2,854,208
Black	136	684	14,845	75,739	6,908	98,312	69,545
Asian	226	542	12,965	38,960	6,324	59,017	81,952
Native American	142	453	2,903	8,721	1,284	13,503	41,065
Others	423	1,456	12,058	41,839	7,014	62,790	91,171
Hispanic	471	1,274	8,322	35,882	7,105	53,054	88,732
Color	1,204	3,867	46,861	179,550	24,834	256,316	322,491
White (%)	97.84	97.37	92.08	81.02	89.71	86.89	90.96
Black (%)	0.32	0.58	2.75	8.70	3.30	5.52	2.22
Asian (%)	0.53	0.46	2.40	4.47	3.02	3.31	2.61
Native American (%)	0.33	0.38	0.54	1.00	0.61	0.76	1.31
Others (%)	1.00	1.23	2.23	4.80	3.35	3.52	2.91
Hispanic (%)	1.11	1.07	1.54	4.12	3.40	2.98	2.83
Color (%)	2.84	3.26	8.67	20.62	11.87	14.39	10.28
Female (%)	49.82	49.18	50.15	50.49	51.67	50.42	50.56
Old (65 + years) (%)	6.90	7.27	7.58	10.81	12.85	9.74	13.38
Kid (< 5 years) (%)	10.34	9.98	8.97	7.85	8.08	8.42	7.85
Native-born (%)	98.88	98.66	95.66	90.44	93.44	93.12	95.60
Renter housing units (%)	12.93	12.94	20.98	35.10	22.67	27.79	21.03
College degree or higher (%)	17.31	19.96	28.03	35.98	36.59	32.31	24.69
Unemployment (%)	3.02	2.83	3.16	4.16	3.04	3.61	4.32
Poverty (%)	3.65	4.35	4.74	9.65	4.69	7.08	8.43
Mean household income ($)	76,311	82,793	86,842	81,397	89,604	83,920	68,262
Year 2010							
Total population	56,001	163,032	591,309	898,525	241,302	1,950,169	3,291,745
White	53,442	154,601	511,554	704,342	204,643	1,628,582	2,911,244
Black	322	2,718	32,957	96,531	10,693	143,221	113,944
Asian	248	2,726	26,447	47,382	13,747	90,550	115,787
Native American	310	550	2,322	6,891	1,748	11,821	43,549
Others	1,679	2,437	18,029	43,379	10,471	75,995	107,221
Hispanic	1,504	2,787	18,029	53,937	13,668	89,925	143,791
Color	3,430	10,491	90,337	226,762	44,376	375,396	469,677
White (%)	95.43	94.83	86.51	78.39	84.81	83.51	88.44

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	0.57	1.67	5.57	10.74	4.43	7.34	3.46
Asian (%)	0.44	1.67	4.47	5.27	5.70	4.64	3.52
Native American (%)	0.55	0.34	0.39	0.77	0.72	0.61	1.32
Others (%)	3.00	1.49	3.05	4.83	4.34	3.90	3.26
Hispanic (%)	2.69	1.71	3.05	6.00	5.66	4.61	4.37
Color (%)	6.12	6.43	15.28	25.24	18.39	19.25	14.27
Female (%)	49.17	49.35	50.35	50.44	51.81	50.46	50.32
Old (65 + years) (%)	7.32	8.45	9.48	10.91	12.93	10.42	13.82
Kid (< 5 years) (%)	8.07	8.59	6.99	6.70	7.22	7.05	6.54
Native-born (%)	98.28	97.05	92.38	88.58	89.81	90.87	94.26
Renter housing units (%)	13.58	12.56	20.95	34.26	21.69	26.72	21.13
College degree or higher (%)	22.50	25.62	31.34	40.69	41.11	36.27	28.58
Unemployment (%)	5.83	6.43	6.56	7.14	5.84	6.71	6.18
Poverty (%)	5.41	6.30	8.05	13.12	7.15	10.05	10.91
Mean household income ($)	78,611	81,582	84,060	80,013	88,509	82,333	68,448
Index	28	28	28	28	28	28	28

Table B. 56

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Monticello Nuclear Generating Plant, Minnesota

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	1338	1.02	888	87.82	450	81.85	5.968***	(5.84)
Black	1338	0.65	888	3.66	450	8.58	-4.922***	(-7.56)
Asian	1338	0.33	888	3.37	450	4.70	-1.336***	(-4.02)
Native American	1338	0.19	888	1.48	450	0.68	0.802***	(4.22)
Others	1338	0.22	888	3.23	450	4.19	-0.962***	(-4.35)
Hispanic	1338	0.39	888	4.26	450	5.15	-0.890*	(-2.30)
Color	1338	1.12	888	14.33	450	21.22	-6.891***	(-6.17)
White (2000)	1338	1.01	888	90.34	450	85.50	4.837***	(4.78)
Black	1338	0.60	888	2.38	450	6.42	-4.039***	(-6.72)
Asian	1338	0.26	888	2.55	450	3.43	-0.874***	(-3.40)
Native American	1338	0.19	888	1.38	450	0.85	0.531**	(2.81)
Others	1338	0.25	888	2.90	450	3.80	-0.906***	(-3.65)
Hispanic	1338	0.27	888	2.75	450	3.23	-0.48	(-1.76)
Color	1338	1.05	888	10.40	450	15.84	-5.437***	(-5.20)
White (1990)	1338	0.79	888	94.75	450	92.05	2.699***	(3.40)
Black	1338	0.55	888	1.41	450	4.38	-2.976***	(-5.38)
Asian	1338	0.21	888	1.64	450	1.99	-0.352	(-1.70)
Native American	1338	0.22	888	1.24	450	1.17	0.0667	(0.31)
Others	1338	0.05	888	0.52	450	0.40	0.112*	(2.16)
Hispanic	1338	0.09	888	1.18	450	1.04	0.144	(1.66)
Color	1338	0.77	888	5.43	450	8.55	-3.117***	(-4.03)

t statistics in parentheses

+ p<0.10, *p<0.05, **p<0.01, ***p<0.001

29. Prairie Island Nuclear Generating Plant, Minnesota

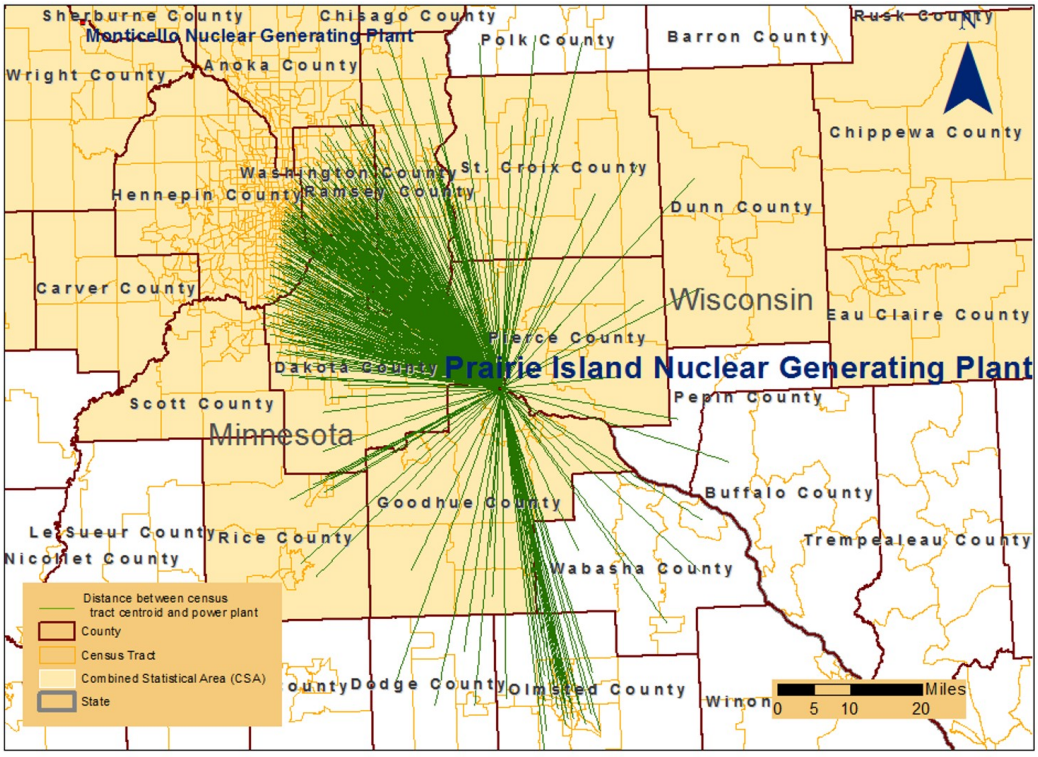

Figure B. 29 Distance to census-tract center points of census tracts within a 50-mile radius of Prairie Island Nuclear Generating Plant, Minnesota in 1990, 2000, and 2010

Table B. 57

Demographic Composition of Population, as sorted by Distance from Prairie Island Nuclear Generating Plant, Minnesota in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	5	22	107	260	56	450	2,297
Tract area (sq. mile)	226	1,126	1,319	2,217	756	5,643	146,789
Total population	22,549	81,536	306,309	877,923	177,005	1,465,322	7,801,560
White	22,086	80,351	295,746	772,878	170,339	1,341,400	7,306,105
Black	58	274	3,477	47,572	1,163	52,544	286,553
Asian	83	534	4,878	36,398	4,569	46,462	83,347
Native American	261	162	877	13,085	533	14,918	74,299
Others	61	221	1,325	7,978	399	9,984	51,206
Hispanic	165	544	4,003	18,221	1,505	24,438	112,824
Color	557	1,526	13,167	114,195	7,742	137,187	554,420
White (%)	97.95	98.55	96.55	88.03	96.23	91.54	93.65
Black (%)	0.26	0.34	1.14	5.42	0.66	3.59	3.67
Asian (%)	0.37	0.65	1.59	4.15	2.58	3.17	1.07
Native American (%)	1.16	0.20	0.29	1.49	0.30	1.02	0.95
Others (%)	0.27	0.27	0.43	0.91	0.23	0.68	0.66
Hispanic (%)	0.73	0.67	1.31	2.08	0.85	1.67	1.45
Color (%)	2.47	1.87	4.30	13.01	4.37	9.36	7.11
Female (%)	50.66	50.01	50.79	51.50	51.46	51.25	50.99
Old (65 + years) (%)	13.81	9.28	7.62	11.91	10.24	10.69	13.34
Kid (< 5 years) (%)	8.85	9.84	10.75	9.37	9.93	9.74	8.99
Native-born (%)	99.28	98.84	97.90	94.95	96.42	96.02	97.74
Renter housing units (%)	24.76	21.14	22.60	35.53	23.94	30.80	26.84
Education (%)	13.88	18.20	25.73	27.04	30.90	26.58	18.38
Unemployment (%)	4.20	4.53	3.90	5.00	3.72	4.57	5.29
Poverty (%)	8.19	6.51	5.10	11.59	6.29	9.25	10.70
Mean household income ($)	57,921	67,105	74,654	62,450	75,699	66,560	58,426
Year 2000							
Total population	24,295	96,933	412,332	946,237	207,032	1,686,829	8,596,325
White	23,302	93,933	378,717	744,661	189,405	1,430,018	7,745,659
Black	189	645	9,394	73,590	4,404	88,222	379,990
Asian	87	717	10,698	60,980	7,255	79,737	145,886
Native American	563	360	1,681	10,828	689	14,121	90,108
Others	153	1,284	11,850	56,168	5,274	74,729	234,684
Hispanic	243	1,036	11,383	51,412	4,356	68,430	264,405
Color	1,141	3,574	39,255	220,614	19,805	284,389	970,444
White (%)	95.91	96.91	91.85	78.70	91.49	84.78	90.10
Black (%)	0.78	0.67	2.28	7.78	2.13	5.23	4.42
Asian (%)	0.36	0.74	2.59	6.44	3.50	4.73	1.70
Native American (%)	2.32	0.37	0.41	1.14	0.33	0.84	1.05
Others (%)	0.63	1.32	2.87	5.94	2.55	4.43	2.73
Hispanic (%)	1.00	1.07	2.76	5.43	2.10	4.06	3.08
Color (%)	4.70	3.69	9.52	23.31	9.57	16.86	11.29
Female (%)	49.94	50.20	50.73	50.87	50.90	50.79	50.53
Old (65 + years) (%)	13.66	9.54	7.86	10.95	10.98	10.16	13.08
Kid (< 5 years) (%)	7.17	7.99	9.41	8.13	8.25	8.44	7.77
Native-born (%)	98.80	98.41	95.55	89.64	93.35	92.17	96.25
Renter housing units (%)	21.93	18.39	18.94	34.58	21.17	28.27	25.59
College degree or higher (%)	19.01	23.68	34.26	32.57	36.37	32.75	23.28
Unemployment (%)	3.20	3.68	2.93	4.38	3.36	3.84	4.49
Poverty (%)	5.92	4.92	3.75	10.37	5.46	7.76	8.43
Mean household income ($)	70,523	79,048	90,123	71,653	85,950	78,059	68,873
Year 2010							
Total population	25,260	106,574	472,356	962,120	233,785	1,800,095	9,079,766
White	23,992	101,144	409,258	729,796	208,712	1,472,902	7,981,475
Black	433	1,329	19,120	96,949	8,253	126,084	479,743
Asian	94	1,590	22,719	74,248	10,663	109,314	221,018
Native American	428	325	1,723	9,440	659	12,575	91,984
Others	313	2,186	19,536	51,687	5,498	79,220	305,546
Hispanic	431	2,946	22,211	73,753	8,799	108,140	436,125
Color	1,518	7,437	75,956	275,734	31,748	392,393	1,355,202
White (%)	94.98	94.90	86.64	75.85	89.28	81.82	87.90

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	1.71	1.25	4.05	10.08	3.53	7.00	5.28
Asian (%)	0.37	1.49	4.81	7.72	4.56	6.07	2.43
Native American (%)	1.69	0.30	0.36	0.98	0.28	0.70	1.01
Others (%)	1.24	2.05	4.14	5.37	2.35	4.40	3.37
Hispanic (%)	1.71	2.76	4.70	7.67	3.76	6.01	4.80
Color (%)	6.01	6.98	16.08	28.66	13.58	21.80	14.93
Female (%)	51.14	50.26	50.74	50.57	50.99	50.66	50.34
Old (65 + years) (%)	15.68	10.71	9.34	10.85	12.35	10.71	13.44
Kid (< 5 years) (%)	5.76	6.17	7.13	6.81	6.95	6.86	6.43
Native-born (%)	98.77	97.31	92.71	87.49	92.28	90.22	95.06
Renter housing units (%)	17.84	17.08	19.44	33.74	19.84	27.23	24.63
College degree or higher (%)	21.96	27.51	39.29	36.87	40.08	37.16	26.81
Unemployment (%)	4.56	6.12	5.59	7.58	4.90	6.58	6.51
Poverty (%)	7.82	6.84	5.61	15.15	7.58	11.04	11.14
Mean household income ($)	67,433	77,993	89,852	70,134	85,429	77,474	67,642
Index	29	29	29	29	29	29	29

Table B. 58

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Prairie Island Nuclear Generating Plant, Minnesota

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	2747	0.98	2297	85.76	450	80.06	5.700***	(5.83)
Black	2747	0.62	2297	6.42	450	7.96	-1.540*	(-2.49)
Asian	2747	0.38	2297	2.33	450	6.22	-3.891***	(-10.26)
Native American	2747	0.14	2297	1.17	450	0.85	0.322*	(2.32)
Others	2747	0.23	2297	3.44	450	4.68	-1.239***	(-5.29)
Hispanic	2747	0.41	2297	4.93	450	6.47	-1.546***	(-3.75)
Color	2747	1.07	2297	16.24	450	23.54	-7.295***	(-6.79)
White (2000)	2747	0.97	2297	88.36	450	83.39	4.968***	(5.10)
Black	2747	0.56	2297	5.30	450	5.95	-0.645	(-1.16)
Asian	2747	0.32	2297	1.71	450	4.90	-3.195***	(-9.88)
Native American	2747	0.13	2297	1.18	450	0.88	0.302*	(2.39)
Others	2747	0.27	2297	2.87	450	4.66	-1.791***	(-6.72)
Hispanic	2747	0.30	2297	3.21	450	4.21	-1.005***	(-3.38)
Color	2747	1.01	2297	12.41	450	18.06	-5.646***	(-5.61)
White (1990)	2747	0.80	2297	92.61	450	90.67	1.938*	(2.43)
Black	2747	0.54	2297	3.96	450	4.05	-0.0922	(-0.17)
Asian	2747	0.27	2297	1.05	450	3.31	-2.261***	(-8.53)
Native American	2747	0.17	2297	1.12	450	1.05	0.0704	(0.41)
Others	2747	0.09	2297	0.70	450	0.70	0.00331	(0.04)
Hispanic	2747	0.15	2297	1.50	450	1.66	-0.162	(-1.11)
Color	2747	0.77	2297	7.50	450	10.00	-2.503**	(-3.23)

*p<0.05, **p<0.01, ***p<0.001

30. Grand Gulf Nuclear Station, Mississippi

Figure B. 30 Distance to census-tract center points of census tracts within a 50-mile radius of Grand Gulf Nuclear Station, Mississippi in 1990, 2000, and 2010

Table B. 59

Demographic Composition of Population, as sorted by Distance from Grand Gulf Nuclear Station, Mississippi in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	4	4	14	25	9	56	1,756
Tract area (sq. mile)	662	1,150	763	2,442	1,059	6,076	94,733
Total population	13,756	15,718	48,711	96,720	39,711	214,616	6,578,571
White	3,256	6,666	25,633	50,723	24,195	110,473	4,362,429
Black	10,469	8,994	22,648	45,635	15,440	103,186	2,111,334
Asian	8	45	227	158	15	453	51,928
Native American	24	13	105	104	37	283	28,646
Others	0	0	95	103	26	224	24,232
Hispanic	72	30	224	529	204	1,059	104,288
Color	10,518	9,075	23,128	46,308	15,685	104,714	2,288,766
White (%)	23.67	42.41	52.62	52.44	60.93	51.47	66.31
Black (%)	76.10	57.22	46.49	47.18	38.88	48.08	32.09
Asian (%)	0.06	0.29	0.47	0.16	0.04	0.21	0.79
Native American (%)	0.17	0.08	0.22	0.11	0.09	0.13	0.44
Others (%)	0.00	0.00	0.20	0.11	0.07	0.10	0.37
Hispanic (%)	0.52	0.19	0.46	0.55	0.51	0.49	1.59
Color (%)	76.46	57.74	47.48	47.88	39.50	48.79	34.79
Female (%)	53.61	52.33	53.40	52.87	52.58	52.94	51.99
Old (65 + years) (%)	12.63	11.79	15.02	13.15	14.85	13.75	11.54
Kid (< 5 years) (%)	9.02	10.13	8.99	8.86	9.51	9.11	9.47
Native-born (%)	99.32	99.15	99.31	99.66	99.79	99.55	98.38
Renter housing units (%)	21.23	19.14	27.89	22.99	21.65	23.49	28.43
Education (%)	16.33	9.97	17.11	13.12	9.99	13.42	15.68
Unemployment (%)	18.18	16.81	8.62	11.04	11.56	11.36	9.12
Poverty (%)	43.18	37.24	26.62	30.76	35.34	31.84	23.95
Mean household income ($)	34,522	35,052	44,723	40,505	34,894	39,738	47,036
Year 2000							
Total population	14,443	16,522	49,879	99,218	38,825	218,887	7,094,747
White	3,120	6,426	23,774	50,055	22,303	105,678	4,495,639
Black	11,183	9,801	25,198	47,955	15,904	110,041	2,367,962
Asian	12	106	223	347	246	934	74,323
Native American	7	75	60	187	164	493	37,176
Others	121	114	623	676	207	1,741	119,647
Hispanic	154	142	655	711	334	1,996	143,648
Color	11,338	10,138	26,371	49,479	16,768	114,094	2,676,584
White (%)	21.60	38.89	47.66	50.45	57.44	48.28	63.37
Black (%)	77.43	59.32	50.52	48.33	40.96	50.27	33.38
Asian (%)	0.08	0.64	0.45	0.35	0.63	0.43	1.05
Native American (%)	0.05	0.45	0.12	0.19	0.42	0.23	0.52
Others (%)	0.84	0.69	1.25	0.68	0.53	0.80	1.69
Hispanic (%)	1.07	0.86	1.31	0.72	0.86	0.91	2.02
Color (%)	78.50	61.36	52.87	49.87	43.19	52.12	37.73
Female (%)	52.45	52.54	52.89	52.02	51.79	52.24	51.67
Old (65 + years) (%)	11.43	10.96	13.42	13.71	15.01	13.52	11.74
Kid (< 5 years) (%)	7.75	9.73	8.61	8.14	8.50	8.41	8.57
Native-born (%)	99.10	99.04	99.04	99.22	99.04	99.12	97.83
Renter housing units (%)	17.67	19.85	27.73	23.14	21.98	23.37	27.38
College degree or higher (%)	18.53	12.78	18.40	14.98	10.50	14.99	18.11
Unemployment (%)	16.44	11.41	7.63	8.83	9.09	9.23	7.30
Poverty (%)	32.23	30.18	20.87	24.85	29.21	25.56	19.57
Mean household income ($)	43,808	41,487	53,859	48,053	40,263	47,253	54,864
Year 2010							
Total population	12,168	14,097	49,182	96,251	38,838	210,536	7,161,395
White	2,337	5,095	21,415	49,010	19,965	97,822	4,483,162
Black	9,732	8,840	26,662	46,050	18,424	109,708	2,384,247
Asian	13	47	417	308	50	835	93,118
Native American	7	0	41	189	115	352	40,610
Others	79	115	647	694	284	1,819	160,258
Hispanic	70	213	855	1,075	402	2,615	239,973
Color	9,855	9,116	28,272	47,840	19,273	114,356	2,824,099
White (%)	19.21	36.14	43.54	50.92	51.41	46.46	62.60

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	79.98	62.71	54.21	47.84	47.44	52.11	33.29
Asian (%)	0.11	0.33	0.85	0.32	0.13	0.40	1.30
Native American (%)	0.06	0.00	0.08	0.20	0.30	0.17	0.57
Others (%)	0.65	0.82	1.32	0.72	0.73	0.86	2.24
Hispanic (%)	0.58	1.51	1.74	1.12	1.04	1.24	3.35
Color (%)	80.99	64.67	57.48	49.70	49.62	54.32	39.44
Female (%)	51.97	51.78	51.38	51.57	48.87	51.07	51.26
Old (65 + years) (%)	12.91	12.72	13.18	14.68	13.85	13.95	12.25
Kid (< 5 years) (%)	5.81	6.36	6.84	6.50	7.21	6.66	6.97
Native-born (%)	99.81	99.16	98.42	98.83	99.72	98.98	96.94
Renter housing units (%)	18.07	23.22	29.74	23.24	25.42	24.82	26.48
College degree or higher (%)	16.38	17.28	21.43	16.74	11.63	16.94	20.45
Unemployment (%)	10.22	10.85	9.73	10.95	14.90	11.28	8.39
Poverty (%)	35.13	30.44	23.21	24.33	30.24	26.14	19.18
Mean household income ($)	34,624	41,988	49,130	49,040	47,656	47,561	57,294
Index	30	30	30	30	30	30	30

Table B. 60

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Grand Gulf Nuclear Station, Mississippi

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	1812	3.51	1756	57.36	56	45.35	12.01**	(3.42)
Black	1812	3.53	1756	36.88	56	53.25	-16.37***	(-4.64)
Asian	1812	0.14	1756	1.29	56	0.37	0.921***	(6.55)
Native American	1812	0.09	1756	0.53	56	0.18	0.359***	(4.09)
Others	1812	0.22	1756	2.23	56	0.86	1.368***	(6.27)
Hispanic	1812	0.30	1756	3.48	56	1.35	2.134***	(7.22)
Color	1812	3.46	1756	43.07	56	55.53	-12.46***	(-3.60)
White (2000)	1812	3.47	1756	61.38	56	48.13	13.25***	(3.82)
Black	1812	3.54	1756	35.18	56	50.38	-15.19***	(-4.29)
Asian	1812	0.11	1756	1.07	56	0.41	0.659***	(5.96)
Native American	1812	0.06	1756	0.54	56	0.21	0.322***	(5.03)
Others	1812	0.12	1756	1.75	56	0.87	0.873***	(7.32)
Hispanic	1812	0.17	1756	2.11	56	1.02	1.090***	(6.50)
Color	1812	3.44	1756	39.64	56	52.29	-12.65***	(-3.68)
White (1990)	1812	3.64	1756	66.33	56	52.32	14.00***	(3.84)
Black	1812	3.68	1756	31.95	56	47.19	-15.23***	(-4.14)
Asian	1812	0.09	1756	0.78	56	0.22	0.556***	(6.32)
Native American	1812	0.06	1756	0.43	56	0.14	0.296***	(4.80)
Others	1812	0.06	1756	0.40	56	0.13	0.271***	(4.42)
Hispanic	1812	0.11	1756	1.68	56	0.50	1.178***	(10.27)
Color	1812	3.63	1756	34.72	56	47.95	-13.23***	(-3.65)

*p<0.05, **p<0.01, ***p<0.001

31. Callaway Plant, Missouri

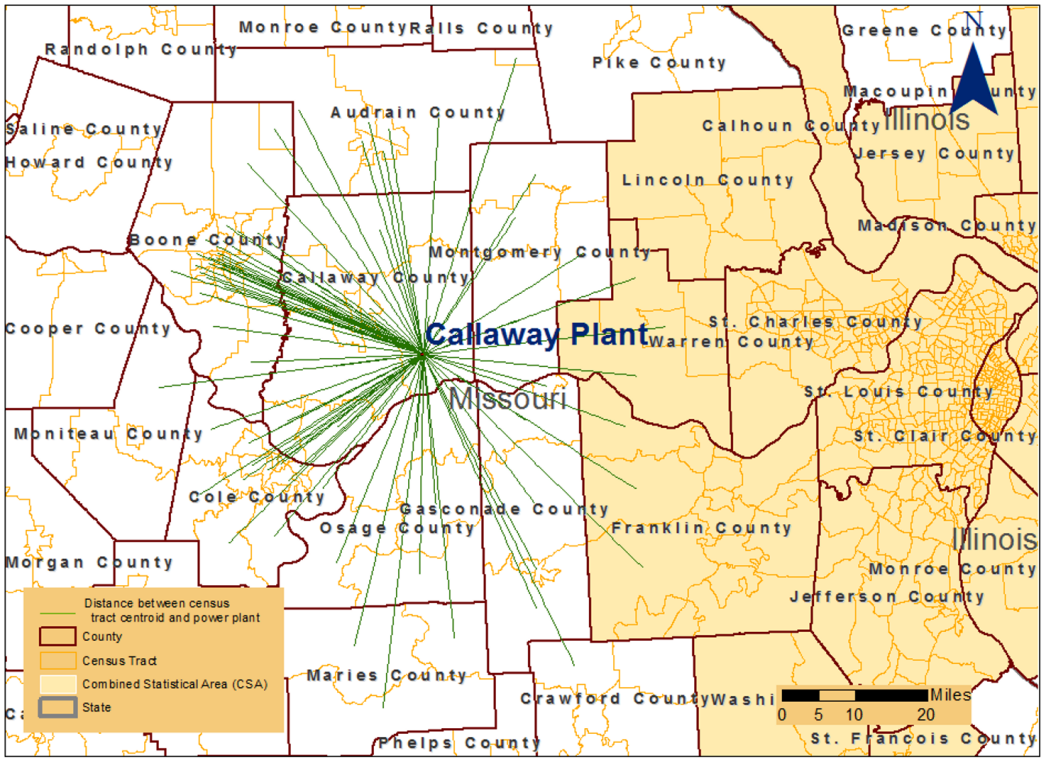

Figure B. 31 Distance to census-tract center points of census tracts within a 50-mile radius of Callaway Plant, Missouri in 1990, 2000, and 2010

Table B. 61

Demographic Composition of Population, as sorted by Distance from Callaway Plant, Missouri in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	2	9	26	39	5	81	1,312
Tract area (sq. mile)	237	1,093	1,412	2,286	724	5,752	63,955
Total population	8,124	32,061	101,712	148,640	16,808	307,345	4,809,724
White	7,439	30,918	94,401	136,270	16,279	285,307	4,201,530
Black	612	910	6,188	8,558	410	16,678	530,170
Asian	33	68	552	2,966	50	3,669	35,912
Native American	31	113	360	446	22	972	21,349
Others	6	59	209	401	45	720	20,729
Hispanic	67	138	803	1,259	77	2,344	58,089
Color	746	1,231	7,858	13,200	574	23,609	643,604
White (%)	91.57	96.43	92.81	91.68	96.85	92.83	87.35
Black (%)	7.53	2.84	6.08	5.76	2.44	5.43	11.02
Asian (%)	0.41	0.21	0.54	2.00	0.30	1.19	0.75
Native American (%)	0.38	0.35	0.35	0.30	0.13	0.32	0.44
Others (%)	0.07	0.18	0.21	0.27	0.27	0.23	0.43
Hispanic (%)	0.82	0.43	0.79	0.85	0.46	0.76	1.21
Color (%)	9.18	3.84	7.73	8.88	3.42	7.68	13.38
Female (%)	49.80	51.20	50.43	50.88	50.40	50.71	51.91
Old (65 + years) (%)	17.68	14.44	13.14	11.06	15.97	12.55	14.12
Kid (< 5 years) (%)	7.40	8.97	8.23	8.44	8.64	8.41	8.67
Native-born (%)	98.89	99.45	98.72	97.05	99.20	98.02	98.39
Renter housing units (%)	25.95	16.96	29.42	32.79	12.97	28.63	27.80
Education (%)	11.90	12.72	22.83	24.24	7.51	21.20	17.59
Unemployment (%)	5.00	3.76	4.82	4.50	6.66	4.65	6.26
Poverty (%)	11.68	9.69	10.61	14.59	14.00	12.63	13.38
Mean household income ($)	44,564	50,121	56,184	51,029	43,086	52,107	55,064
Year 2000							
Total population	10,726	37,518	118,776	171,258	19,448	357,726	5,237,485
White	9,210	35,677	106,388	152,475	18,223	321,973	4,424,979
Black	1,219	969	8,427	11,200	737	22,552	599,535
Asian	125	92	1,256	3,584	10	5,067	58,433
Native American	25	200	400	700	91	1,416	24,784
Others	144	585	2,306	3,299	384	6,718	129,754
Hispanic	73	284	1,467	2,364	127	4,315	112,058
Color	1,550	1,994	13,199	20,214	1,344	38,301	869,073
White (%)	85.87	95.09	89.57	89.03	93.70	90.01	84.49
Black (%)	11.36	2.58	7.09	6.54	3.79	6.30	11.45
Asian (%)	1.17	0.25	1.06	2.09	0.05	1.42	1.12
Native American (%)	0.23	0.53	0.34	0.41	0.47	0.40	0.47
Others (%)	1.34	1.56	1.94	1.93	1.97	1.88	2.48
Hispanic (%)	0.68	0.76	1.24	1.38	0.65	1.21	2.14
Color (%)	14.45	5.31	11.11	11.80	6.91	10.71	16.59
Female (%)	40.42	51.01	50.11	50.89	53.41	50.47	51.48
Old (65 + years) (%)	13.48	12.97	12.16	10.60	14.57	11.67	13.64
Kid (< 5 years) (%)	4.61	7.85	7.48	7.84	6.55	7.56	7.97
Native-born (%)	98.83	99.15	97.90	96.56	99.20	97.49	97.28
Renter housing units (%)	26.33	17.13	30.02	31.51	13.21	28.32	26.61
College degree or higher (%)	13.57	15.21	27.73	29.39	9.14	25.59	21.32
Unemployment (%)	3.91	4.08	4.24	4.73	3.87	4.44	5.36
Poverty (%)	8.77	8.00	11.03	12.64	10.50	11.40	11.76
Mean household income ($)	50,488	58,609	62,757	59,772	51,768	60,034	62,384
Year 2010							
Total population	11,642	39,493	129,790	191,791	20,201	392,917	5,529,397
White	10,081	37,582	112,854	166,198	19,103	345,818	4,592,404
Black	899	945	10,775	13,007	582	26,208	652,854
Asian	120	254	1,772	5,220	6	7,372	89,976
Native American	38	45	381	754	25	1,243	21,586
Others	504	667	4,008	6,612	485	12,276	172,577
Hispanic	333	541	3,417	4,809	308	9,408	189,262
Color	1,728	2,394	18,442	27,658	1,333	51,555	1,051,943
White (%)	86.59	95.16	86.95	86.66	94.56	88.01	83.05

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	7.72	2.39	8.30	6.78	2.88	6.67	11.81
Asian (%)	1.03	0.64	1.37	2.72	0.03	1.88	1.63
Native American (%)	0.33	0.11	0.29	0.39	0.12	0.32	0.39
Others (%)	4.33	1.69	3.09	3.45	2.40	3.12	3.12
Hispanic (%)	2.86	1.37	2.63	2.51	1.52	2.39	3.42
Color (%)	14.84	6.06	14.21	14.42	6.60	13.12	19.02
Female (%)	43.81	50.72	50.70	50.97	53.54	50.78	51.13
Old (65 + years) (%)	11.40	13.54	12.62	11.04	15.68	12.06	13.84
Kid (< 5 years) (%)	4.22	6.42	6.59	6.16	6.72	6.30	6.55
Native-born (%)	99.30	98.89	96.92	95.34	99.70	96.56	96.33
Renter housing units (%)	29.76	17.43	30.41	31.18	12.55	28.49	26.07
College degree or higher (%)	15.86	19.76	30.90	33.30	10.69	29.22	24.77
Unemployment (%)	6.11	6.54	5.05	6.10	7.20	5.85	7.56
Poverty (%)	16.14	9.70	14.30	15.34	12.41	14.29	13.95
Mean household income ($)	57,079	58,081	61,274	60,457	50,873	59,960	61,327
Index	31	31	31	31	31	31	31

Table B. 62

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Callaway Plant, Missouri

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	1393	1.53	1312	80.34	81	88.45	-8.113***	(-5.32)
Black	1393	1.26	1312	14.23	81	6.57	7.666***	(6.10)
Asian	1393	0.36	1312	1.53	81	1.75	-0.215	(-0.60)
Native American	1393	0.06	1312	0.38	81	0.29	0.0968	(1.63)
Others	1393	0.31	1312	3.13	81	2.95	0.184	(0.59)
Hispanic	1393	0.32	1312	3.51	81	2.27	1.242***	(3.92)
Color	1393	1.56	1312	21.37	81	12.63	8.740***	(5.62)
White (2000)	1393	1.44	1312	82.84	81	90.00	-7.165***	(-4.98)
Black	1393	1.24	1312	13.04	81	6.28	6.759***	(5.47)
Asian	1393	0.29	1312	1.09	81	1.43	-0.341	(-1.18)
Native American	1393	0.05	1312	0.47	81	0.40	0.0748	(1.47)
Others	1393	0.17	1312	2.56	81	1.89	0.670***	(3.84)
Hispanic	1393	0.16	1312	2.23	81	1.15	1.081***	(6.59)
Color	1393	1.47	1312	18.26	81	10.66	7.593***	(5.18)
White (1990)	1393	1.22	1312	87.49	81	92.87	-5.379***	(-4.41)
Black	1393	1.12	1312	10.82	81	5.44	5.387***	(4.79)
Asian	1393	0.27	1312	0.71	81	1.15	-0.442	(-1.63)
Native American	1393	0.04	1312	0.46	81	0.32	0.134***	(3.48)
Others	1393	0.05	1312	0.44	81	0.22	0.220***	(4.32)
Hispanic	1393	0.11	1312	1.23	81	0.75	0.486***	(4.52)
Color	1393	1.23	1312	13.18	81	7.63	5.548***	(4.50)

*p<0.05, **p<0.01, ***p<0.001

32. Cooper Nuclear Station, Nebraska

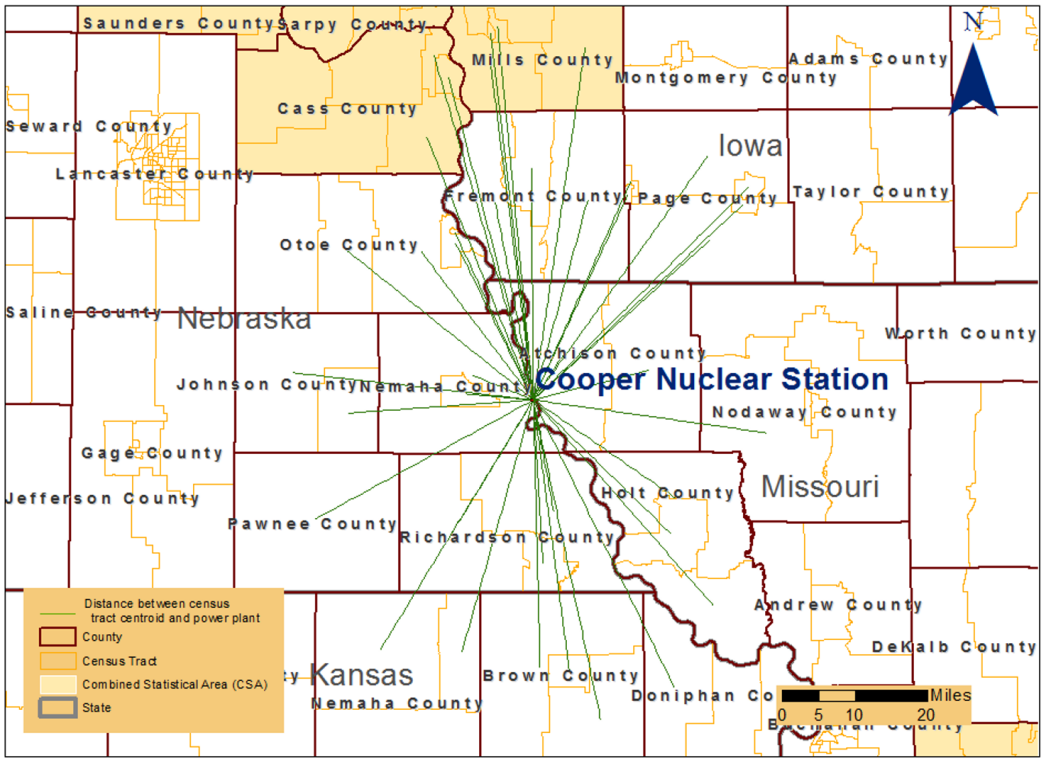

Figure B. 32 Distance to census-tract center points of census tracts within a 50-mile radius of Cooper Nuclear Station, Nebraska in 1990, 2000, and 2010

Table B. 63

Demographic Composition of Population, as sorted by Distance from Cooper Nuclear Station, Nebraska in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	3	2	10	14	9	38	3,482
Tract area (sq. mile)	670	554	1,395	2,259	1,290	6,168	279,438
Total population	11,078	6,798	28,334	40,875	30,314	117,399	11,832,396
White	10,993	6,521	28,042	39,923	29,763	115,242	10,771,594
Black	36	121	8	191	107	463	792,724
Asian	4	23	94	87	67	275	107,311
Native American	45	91	100	607	285	1,128	64,822
Others	0	42	90	66	91	289	95,907
Hispanic	26	47	281	341	187	882	215,579
Color	111	291	483	1,198	637	2,720	1,174,239
White (%)	99.23	95.93	98.97	97.67	98.18	98.16	91.03
Black (%)	0.32	1.78	0.03	0.47	0.35	0.39	6.70
Asian (%)	0.04	0.34	0.33	0.21	0.22	0.23	0.91
Native American (%)	0.41	1.34	0.35	1.49	0.94	0.96	0.55
Others (%)	0.00	0.62	0.32	0.16	0.30	0.25	0.81
Hispanic (%)	0.23	0.69	0.99	0.83	0.62	0.75	1.82
Color (%)	1.00	4.28	1.70	2.93	2.10	2.32	9.92
Female (%)	50.41	51.21	52.66	51.81	50.12	51.41	51.52
Old (65 + years) (%)	20.05	18.05	22.90	22.09	16.21	20.34	14.24
Kid (< 5 years) (%)	7.10	8.68	7.85	7.71	8.95	8.06	8.78
Native-born (%)	99.58	99.35	99.34	99.31	99.15	99.30	98.16
Renter housing units (%)	28.30	28.07	25.15	23.16	23.77	24.59	28.50
Education (%)	16.66	14.17	11.89	12.85	12.15	12.87	18.46
Unemployment (%)	2.82	3.46	5.06	3.72	3.87	3.98	5.15
Poverty (%)	13.18	18.28	12.73	14.12	12.91	13.62	12.22
Mean household income ($)	45,263	39,940	42,655	43,994	45,163	43,834	54,371
Year 2000							
Total population	10,205	6,117	27,836	40,863	30,847	115,868	12,805,348
White	10,040	5,854	26,739	39,308	29,413	111,354	11,231,241
Black	24	138	46	236	319	763	899,101
Asian	58	4	248	103	194	607	166,650
Native American	27	50	220	730	546	1,573	74,034
Others	56	71	583	486	373	1,569	434,324
Hispanic	50	25	578	408	566	1,627	476,418
Color	201	273	1,399	1,792	1,733	5,398	1,784,914
White (%)	98.38	95.70	96.06	96.19	95.35	96.10	87.71
Black (%)	0.24	2.26	0.17	0.58	1.03	0.66	7.02
Asian (%)	0.57	0.07	0.89	0.25	0.63	0.52	1.30
Native American (%)	0.26	0.82	0.79	1.79	1.77	1.36	0.58
Others (%)	0.55	1.16	2.09	1.19	1.21	1.35	3.39
Hispanic (%)	0.49	0.41	2.08	1.00	1.83	1.40	3.72
Color (%)	1.97	4.46	5.03	4.39	5.62	4.66	13.94
Female (%)	51.54	49.84	51.53	51.59	49.04	50.80	51.06
Old (65 + years) (%)	19.63	18.54	20.37	20.71	16.17	19.21	13.73
Kid (< 5 years) (%)	5.47	5.72	7.01	7.04	7.26	6.88	8.04
Native-born (%)	99.33	99.79	97.93	99.19	98.84	98.84	96.48
Renter housing units (%)	25.06	24.13	24.08	21.84	23.24	23.17	27.28
College degree or higher (%)	20.44	18.28	14.41	17.15	15.44	16.39	22.70
Unemployment (%)	5.61	3.81	4.27	3.47	5.63	4.44	4.58
Poverty (%)	11.85	12.37	10.58	9.70	9.73	10.25	10.50
Mean household income ($)	51,308	46,785	50,783	52,927	54,282	52,257	62,562
Year 2010							
Total population	9,770	5,155	27,379	38,925	29,884	111,113	13,435,922
White	9,501	4,976	26,004	36,883	28,213	105,577	11,585,698
Black	63	1	352	169	648	1,233	1,000,265
Asian	17	5	86	231	86	425	246,824
Native American	56	53	113	790	313	1,325	71,402
Others	133	120	824	852	624	2,553	531,733
Hispanic	114	37	1,430	738	598	2,917	760,764
Color	342	195	2,460	2,343	2,146	7,486	2,308,154
White (%)	97.25	96.53	94.98	94.75	94.41	95.02	86.23

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	0.64	0.02	1.29	0.43	2.17	1.11	7.44
Asian (%)	0.17	0.10	0.31	0.59	0.29	0.38	1.84
Native American (%)	0.57	1.03	0.41	2.03	1.05	1.19	0.53
Others (%)	1.36	2.33	3.01	2.19	2.09	2.30	3.96
Hispanic (%)	1.17	0.72	5.22	1.90	2.00	2.63	5.66
Color (%)	3.50	3.78	8.98	6.02	7.18	6.74	17.18
Female (%)	51.28	50.79	49.32	52.35	47.44	50.12	50.80
Old (65 + years) (%)	18.54	19.96	20.09	20.74	15.93	19.06	13.75
Kid (< 5 years) (%)	5.94	5.24	5.95	5.72	6.36	5.95	6.75
Native-born (%)	98.88	99.17	97.13	98.63	98.68	98.32	95.36
Renter housing units (%)	24.19	20.13	22.92	21.22	20.22	21.63	26.45
College degree or higher (%)	22.21	19.79	16.22	18.04	17.92	17.98	26.22
Unemployment (%)	5.28	6.84	5.08	4.60	4.63	4.90	6.33
Poverty (%)	13.21	12.57	13.80	11.43	9.83	11.80	12.85
Mean household income ($)	54,322	52,507	49,662	52,796	58,011	53,419	62,412
Index	32	32	32	32	32	32	32

Table B. 64

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Cooper Nuclear Station, Nebraska

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	3520	1.00	3482	84.85	38	95.19	-10.34***	(-10.39)
Black	3520	0.52	3482	8.41	38	1.00	7.405***	(14.14)
Asian	3520	0.13	3482	1.69	38	0.42	1.273***	(9.99)
Native American	3520	0.64	3482	0.55	38	1.21	-0.661	(-1.03)
Others	3520	0.28	3482	3.99	38	2.19	1.803***	(6.47)
Hispanic	3520	0.51	3482	5.76	38	2.34	3.426***	(6.73)
Color	3520	1.12	3482	18.08	38	6.29	11.78***	(10.54)
White (2000)	3520	0.78	3482	86.87	38	96.23	-9.360***	(-12.02)
Black	3520	0.38	3482	7.67	38	0.59	7.080***	(18.52)
Asian	3520	0.13	3482	1.26	38	0.54	0.727***	(5.48)
Native American	3520	0.52	3482	0.59	38	1.29	-0.705	(-1.35)
Others	3520	0.21	3482	3.43	38	1.35	2.083***	(9.86)
Hispanic	3520	0.26	3482	3.75	38	1.34	2.412***	(9.18)
Color	3520	0.79	3482	14.56	38	4.47	10.09***	(12.80)
White (1990)	3520	0.55	3482	91.12	38	98.25	-7.131***	(-13.00)
Black	3520	0.32	3482	6.54	38	0.34	6.206***	(19.29)
Asian	3520	0.10	3482	0.85	38	0.25	0.598***	(6.24)
Native American	3520	0.42	3482	0.55	38	0.93	-0.376	(-0.90)
Others	3520	0.08	3482	0.80	38	0.23	0.565***	(7.51)
Hispanic	3520	0.16	3482	1.80	38	0.72	1.079***	(6.74)
Color	3520	0.57	3482	9.69	38	2.22	7.473***	(13.10)

*p<0.05, **p<0.01, ***p<0.001

33. Fort Calhoun Station, Nebraska

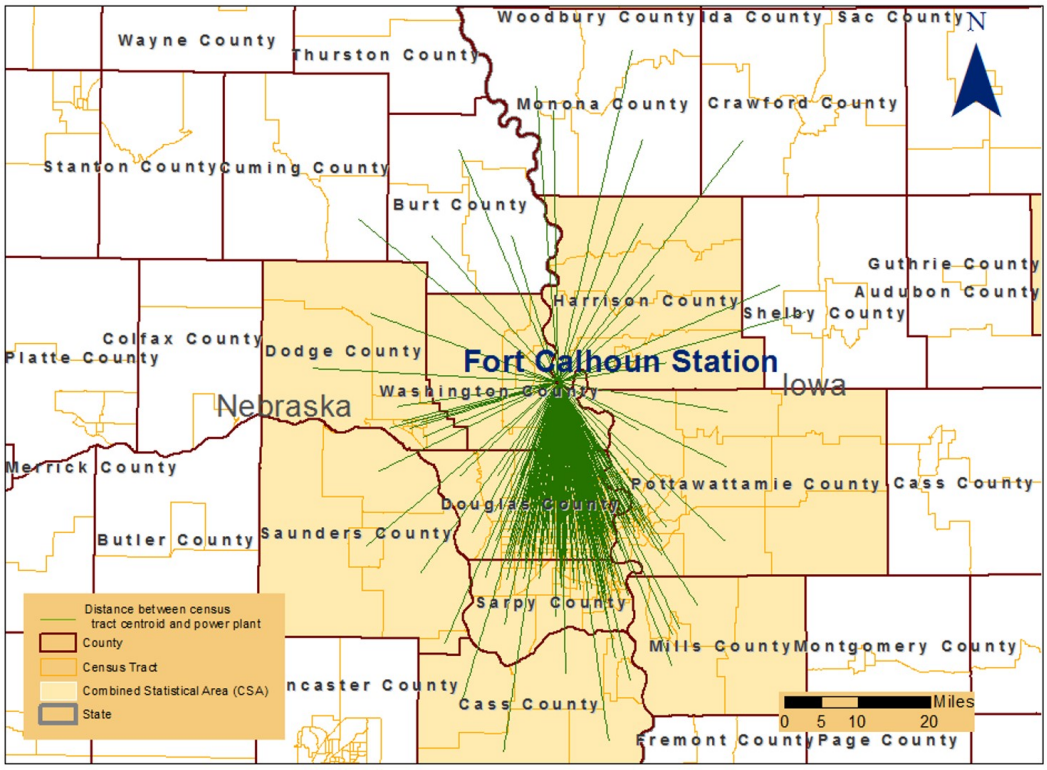

Figure B. 33 Distance to census-tract center points of census tracts within a 50-mile radius of Fort Calhoun Station, Nebraska in 1990, 2000, and 2010

Table B. 65

Demographic Composition of Population, as sorted by Distance from Fort Calhoun Station, Nebraska in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	5	91	142	24	7	269	1,088
Tract area (sq. mile)	173	1,121	1,468	1,809	1,015	5,587	128,033
Total population	15,687	243,551	385,024	67,593	19,265	731,120	3,624,019
White	15,520	197,208	365,490	65,201	19,059	662,478	3,503,625
Black	57	40,882	8,879	1,314	14	51,146	53,236
Asian	14	2,585	4,064	551	77	7,291	29,598
Native American	50	1,411	1,855	281	66	3,663	16,713
Others	46	1,469	4,735	239	49	6,538	20,853
Hispanic	101	3,404	11,444	772	77	15,798	49,936
Color	203	48,090	25,988	2,847	233	77,361	148,684
White (%)	98.94	80.97	94.93	96.46	98.93	90.61	96.68
Black (%)	0.36	16.79	2.31	1.94	0.07	7.00	1.47
Asian (%)	0.09	1.06	1.06	0.82	0.40	1.00	0.82
Native American (%)	0.32	0.58	0.48	0.42	0.34	0.50	0.46
Others (%)	0.29	0.60	1.23	0.35	0.25	0.89	0.58
Hispanic (%)	0.64	1.40	2.97	1.14	0.40	2.16	1.38
Color (%)	1.29	19.75	6.75	4.21	1.21	10.58	4.10
Female (%)	52.09	52.19	51.25	50.24	49.94	51.45	51.46
Old (65 + years) (%)	14.94	11.82	10.76	14.22	14.82	11.63	15.56
Kid (< 5 years) (%)	7.93	9.77	9.53	9.20	9.15	9.53	8.52
Native-born (%)	99.18	98.00	97.56	98.55	99.16	97.87	98.45
Renter housing units (%)	23.19	33.51	33.46	25.47	18.76	32.13	28.23
Education (%)	15.67	24.03	20.98	16.33	11.87	21.20	16.89
Unemployment (%)	3.45	4.78	3.80	3.61	4.57	4.13	4.23
Poverty (%)	7.06	12.19	8.33	7.98	11.99	9.65	11.71
Mean household income ($)	57,733	60,822	58,746	51,719	47,843	58,519	51,287
Year 2000							
Total population	17,820	273,372	428,422	73,370	20,776	813,760	3,823,827
White	17,428	212,241	385,082	69,991	20,304	705,046	3,578,478
Black	66	45,594	11,847	1,090	15	58,612	68,581
Asian	77	4,722	5,996	477	76	11,348	46,429
Native American	38	1,945	2,326	310	107	4,726	19,958
Others	211	8,868	23,181	1,488	274	34,022	110,387
Hispanic	215	8,080	31,824	1,619	429	42,167	133,206
Color	451	64,820	56,609	4,233	724	126,837	302,171
White (%)	97.80	77.64	89.88	95.39	97.73	86.64	93.58
Black (%)	0.37	16.68	2.77	1.49	0.07	7.20	1.79
Asian (%)	0.43	1.73	1.40	0.65	0.37	1.39	1.21
Native American (%)	0.21	0.71	0.54	0.42	0.52	0.58	0.52
Others (%)	1.18	3.24	5.41	2.03	1.32	4.18	2.89
Hispanic (%)	1.21	2.96	7.43	2.21	2.06	5.18	3.48
Color (%)	2.53	23.71	13.21	5.77	3.48	15.59	7.90
Female (%)	51.27	51.74	50.59	50.30	49.71	50.94	50.88
Old (65 + years) (%)	14.14	11.27	11.04	14.03	14.54	11.54	15.03
Kid (< 5 years) (%)	8.26	8.82	8.82	7.81	7.57	8.68	7.76
Native-born (%)	98.23	96.35	94.38	97.90	98.89	95.56	96.61
Renter housing units (%)	23.07	33.28	32.30	22.68	17.59	31.18	26.57
College degree or higher (%)	21.39	29.81	25.81	20.84	14.79	26.29	21.26
Unemployment (%)	3.44	4.42	3.38	2.92	3.62	3.69	4.00
Poverty (%)	6.08	10.53	7.60	5.89	7.76	8.40	9.55
Mean household income ($)	66,484	70,483	69,512	64,129	59,642	69,052	59,757
Year 2010							
Total population	18,933	298,263	474,429	78,563	20,775	890,963	3,924,429
White	18,330	224,840	418,617	73,280	20,297	755,364	3,605,903
Black	100	48,836	13,921	1,680	74	64,611	96,057
Asian	79	7,326	8,489	771	67	16,732	65,425
Native American	8	1,343	2,108	515	10	3,984	21,492
Others	416	15,918	31,294	2,317	327	50,272	135,552
Hispanic	464	14,601	55,721	3,011	461	74,258	214,645
Color	824	81,377	87,845	7,015	855	177,916	445,849
White (%)	96.82	75.38	88.24	93.28	97.70	84.78	91.88

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	0.53	16.37	2.93	2.14	0.36	7.25	2.45
Asian (%)	0.42	2.46	1.79	0.98	0.32	1.88	1.67
Native American (%)	0.04	0.45	0.44	0.66	0.05	0.45	0.55
Others (%)	2.20	5.34	6.60	2.95	1.57	5.64	3.45
Hispanic (%)	2.45	4.90	11.74	3.83	2.22	8.33	5.47
Color (%)	4.35	27.28	18.52	8.93	4.12	19.97	11.36
Female (%)	50.77	51.68	50.42	49.39	50.43	50.76	50.55
Old (65 + years) (%)	13.95	11.02	11.06	14.57	15.10	11.51	14.90
Kid (< 5 years) (%)	6.68	7.48	7.81	6.84	6.44	7.56	6.63
Native-born (%)	98.66	94.66	92.13	97.17	98.48	93.71	95.54
Renter housing units (%)	19.96	31.75	30.01	20.20	16.82	29.19	25.29
College degree or higher (%)	26.38	34.75	30.89	25.69	20.46	31.34	24.42
Unemployment (%)	3.89	6.53	5.72	4.34	4.77	5.82	5.07
Poverty (%)	5.66	13.83	10.39	7.25	7.61	11.09	11.82
Mean household income ($)	69,650	69,389	68,860	69,785	65,129	69,048	60,642
Index	33	33	33	33	33	33	33

Table B. 66 *Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Fort Calhoun Station, Nebraska*

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	1357	1.23	1088	91.96	269	83.59	8.372***	(6.80)
Black	1357	1.03	1088	2.52	269	8.23	-5.705***	(-5.53)
Asian	1357	0.17	1088	1.47	269	1.78	-0.315	(-1.86)
Native American	1357	0.11	1088	0.57	269	0.50	0.0735	(0.65)
Others	1357	0.44	1088	3.29	269	5.90	-2.610***	(-5.96)
Hispanic	1357	0.81	1088	5.08	269	8.45	-3.372***	(-4.16)
Color	1357	1.39	1088	10.86	269	21.13	-10.27***	(-7.41)
White (2000)	1357	1.19	1088	93.50	269	86.31	7.184***	(6.04)
Black	1357	1.05	1088	1.94	269	7.53	-5.588***	(-5.32)
Asian	1357	0.12	1088	1.14	269	1.39	-0.251*	(-2.02)
Native American	1357	0.09	1088	0.53	269	0.58	-0.0541	(-0.59)
Others	1357	0.38	1088	2.71	269	4.18	-1.474***	(-3.89)
Hispanic	1357	0.55	1088	3.22	269	5.15	-1.936***	(-3.53)
Color	1357	1.26	1088	7.71	269	15.88	-8.168***	(-6.50)
White (1990)	1357	1.09	1088	96.57	269	90.95	5.614***	(5.13)
Black	1357	1.06	1088	1.65	269	6.79	-5.143***	(-4.86)
Asian	1357	0.10	1088	0.77	269	0.93	-0.162	(-1.70)
Native American	1357	0.09	1088	0.46	269	0.49	-0.027	(-0.32)
Others	1357	0.11	1088	0.55	269	0.88	-0.321**	(-2.91)
Hispanic	1357	0.22	1088	1.31	269	2.16	-0.847***	(-3.93)
Color	1357	1.11	1088	4.17	269	10.26	-6.088***	(-5.50)

*p<0.05, **p<0.01, ***p<0.001

34. Seabrook Station, New Hampshire

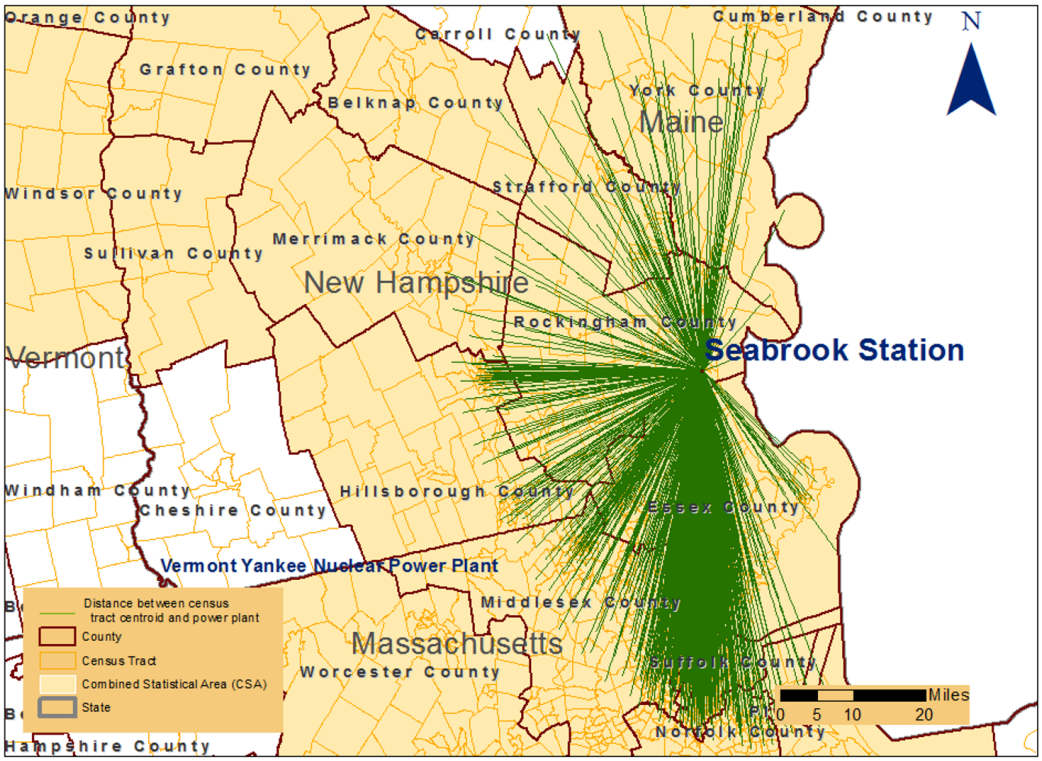

Figure B. 34 Distance to census-tract center points of census tracts within a 50-mile radius of Seabrook Station, New Hampshire in 1990, 2000, and 2010

Table B. 67

Demographic Composition of Population, as sorted by Distance from Seabrook Station, New Hampshire in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	30	78	180	271	309	868	1,263
Tract area (sq. mile)	270	650	1,185	1,256	835	4,195	51,088
Total population	101,342	310,511	755,938	1,146,601	1,151,223	3,465,615	4,887,988
White	100,218	296,305	703,646	1,067,227	891,135	3,058,531	4,648,230
Black	336	4,414	9,885	28,791	164,244	207,670	101,835
Asian	410	2,935	17,657	30,075	56,099	107,176	49,462
Native American	180	635	1,688	2,037	2,630	7,170	14,233
Others	189	6,229	23,044	18,449	37,142	85,053	74,211
Hispanic	522	12,218	42,624	41,738	69,970	167,072	127,409
Color	1,564	18,932	67,906	100,792	288,926	478,120	301,834
White (%)	98.89	95.42	93.08	93.08	77.41	88.25	95.09
Black (%)	0.33	1.42	1.31	2.51	14.27	5.99	2.08
Asian (%)	0.40	0.95	2.34	2.62	4.87	3.09	1.01
Native American (%)	0.18	0.20	0.22	0.18	0.23	0.21	0.29
Others (%)	0.19	2.01	3.05	1.61	3.23	2.45	1.52
Hispanic (%)	0.52	3.93	5.64	3.64	6.08	4.82	2.61
Color (%)	1.54	6.10	8.98	8.79	25.10	13.80	6.18
Female (%)	51.54	51.11	51.61	51.97	52.50	51.98	51.65
Old (65 + years) (%)	12.60	11.43	11.89	13.44	12.86	12.71	13.66
Kid (< 5 years) (%)	8.52	9.20	9.10	8.13	6.95	8.06	8.53
Native-born (%)	97.14	94.89	92.15	90.00	83.87	89.08	94.42
Renter housing units (%)	25.23	29.89	34.54	39.42	51.12	41.14	27.93
Education (%)	27.42	26.24	23.87	27.40	36.97	29.73	22.67
Unemployment (%)	6.53	6.33	7.05	6.42	6.67	6.63	6.64
Poverty (%)	5.22	6.51	8.73	7.54	12.17	9.15	8.68
Mean household income ($)	76,264	77,196	74,512	76,767	78,690	76,972	66,827
Year 2000							
Total population	117,140	343,887	816,708	1,222,632	1,183,397	3,683,764	5,176,042
White	114,111	318,611	726,005	1,046,964	837,270	3,042,961	4,745,048
Black	547	3,407	12,745	42,309	164,634	223,642	128,546
Asian	714	5,064	25,765	59,376	91,949	182,868	81,452
Native American	114	802	1,683	2,728	3,734	9,061	16,425
Others	1,641	16,016	50,488	71,230	85,848	225,223	204,580
Hispanic	1,173	19,973	64,582	84,956	90,951	261,635	194,841
Color	3,676	31,844	113,423	213,537	380,831	743,311	513,643
White (%)	97.41	92.65	88.89	85.63	70.75	82.60	91.67
Black (%)	0.47	0.99	1.56	3.46	13.91	6.07	2.48
Asian (%)	0.61	1.47	3.15	4.86	7.77	4.96	1.57
Native American (%)	0.10	0.23	0.21	0.22	0.32	0.25	0.32
Others (%)	1.40	4.66	6.18	5.83	7.25	6.11	3.95
Hispanic (%)	1.00	5.81	7.91	6.95	7.69	7.10	3.76
Color (%)	3.14	9.26	13.89	17.47	32.18	20.18	9.92
Female (%)	51.63	51.48	51.42	51.50	52.23	51.72	51.54
Old (65 + years) (%)	12.95	11.78	12.06	13.43	12.32	12.60	14.05
Kid (< 5 years) (%)	7.55	7.86	8.19	7.50	6.38	7.33	7.42
Native-born (%)	96.51	93.65	90.45	85.08	79.70	85.70	93.48
Renter housing units (%)	24.22	27.98	33.65	39.02	51.35	40.52	26.60
College degree or higher (%)	34.62	32.39	28.85	33.10	44.35	35.75	27.72
Unemployment (%)	2.72	3.33	4.20	3.84	5.31	4.32	4.59
Poverty (%)	5.03	6.79	8.20	8.18	12.80	9.40	9.02
Mean household income ($)	88,305	86,147	81,831	84,032	89,198	85,616	72,897
Year 2010							
Total population	120,876	362,044	847,854	1,247,097	1,189,344	3,767,215	5,351,485
White	117,238	322,258	722,244	1,017,788	809,101	2,988,629	4,810,793
Black	648	4,687	18,987	60,905	173,556	258,783	191,609
Asian	1,300	8,066	37,582	85,282	120,580	252,810	127,288
Native American	168	601	1,059	1,834	3,280	6,942	15,479
Others	1,522	26,432	67,982	81,288	82,827	260,051	206,316
Hispanic	1,724	31,377	87,065	128,598	109,397	358,161	279,195
Color	4,811	47,970	154,265	297,323	424,698	929,067	699,721
White (%)	96.99	89.01	85.18	81.61	68.03	79.33	89.90

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	0.54	1.29	2.24	4.88	14.59	6.87	3.58
Asian (%)	1.08	2.23	4.43	6.84	10.14	6.71	2.38
Native American (%)	0.14	0.17	0.12	0.15	0.28	0.18	0.29
Others (%)	1.26	7.30	8.02	6.52	6.96	6.90	3.86
Hispanic (%)	1.43	8.67	10.27	10.31	9.20	9.51	5.22
Color (%)	3.98	13.25	18.19	23.84	35.71	24.66	13.08
Female (%)	51.61	51.32	51.29	51.44	52.13	51.62	51.27
Old (65 + years) (%)	14.87	12.10	12.67	13.31	12.02	12.69	14.42
Kid (< 5 years) (%)	5.10	5.68	6.24	6.01	5.03	5.69	5.53
Native-born (%)	95.50	92.00	88.50	81.16	77.79	83.25	92.07
Renter housing units (%)	21.22	24.51	29.55	36.23	47.37	36.85	24.00
College degree or higher (%)	41.35	37.48	34.01	37.87	50.28	40.93	32.13
Unemployment (%)	5.19	6.10	6.70	6.94	7.32	6.87	7.12
Poverty (%)	5.02	7.26	8.89	9.48	14.91	10.65	10.28
Mean household income ($)	93,745	89,716	83,699	86,038	93,567	88,585	75,537
Index	34	34	34	34	34	34	34

Table B. 68

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Seabrook Station, New Hampshire

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	2131	0.95	1263	89.09	868	76.37	12.71***	(13.35)
Black	2131	0.56	1263	3.48	868	7.76	-4.279***	(-7.60)
Asian	2131	0.29	1263	2.15	868	6.67	-4.519***	(-15.40)
Native American	2131	0.06	1263	0.37	868	0.19	0.172**	(2.76)
Others	2131	0.45	1263	3.97	868	7.63	-3.654***	(-8.06)
Hispanic	2131	0.63	1263	5.50	868	10.42	-4.922***	(-7.86)
Color	2131	1.00	1263	13.11	868	26.42	-13.31***	(-13.25)
White (2000)	2131	0.85	1263	91.46	868	80.82	10.64***	(12.47)
Black	2131	0.53	1263	2.42	868	6.87	-4.449***	(-8.35)
Asian	2131	0.24	1263	1.51	868	5.08	-3.574***	(-14.76)
Native American	2131	0.07	1263	0.41	868	0.26	0.146*	(2.16)
Others	2131	0.40	1263	4.12	868	6.85	-2.722***	(-6.78)
Hispanic	2131	0.53	1263	3.93	868	8.05	-4.119***	(-7.80)
Color	2131	0.95	1263	10.00	868	22.15	-12.15***	(-12.84)
White (1990)	2131	0.77	1263	95.19	868	86.81	8.378***	(10.82)
Black	2131	0.58	1263	1.92	868	6.72	-4.801***	(-8.21)
Asian	2131	0.21	1263	0.97	868	3.25	-2.277***	(-11.02)
Native American	2131	0.08	1263	0.42	868	0.23	0.195*	(2.31)
Others	2131	0.28	1263	1.53	868	2.87	-1.338***	(-4.81)
Hispanic	2131	0.41	1263	2.59	868	5.54	-2.951***	(-7.16)
Color	2131	0.83	1263	5.96	868	15.38	-9.417***	(-11.30)

*p<0.05, **p<0.01, ***p<0.001

35. Hope Creek Generating Station, New Jersey

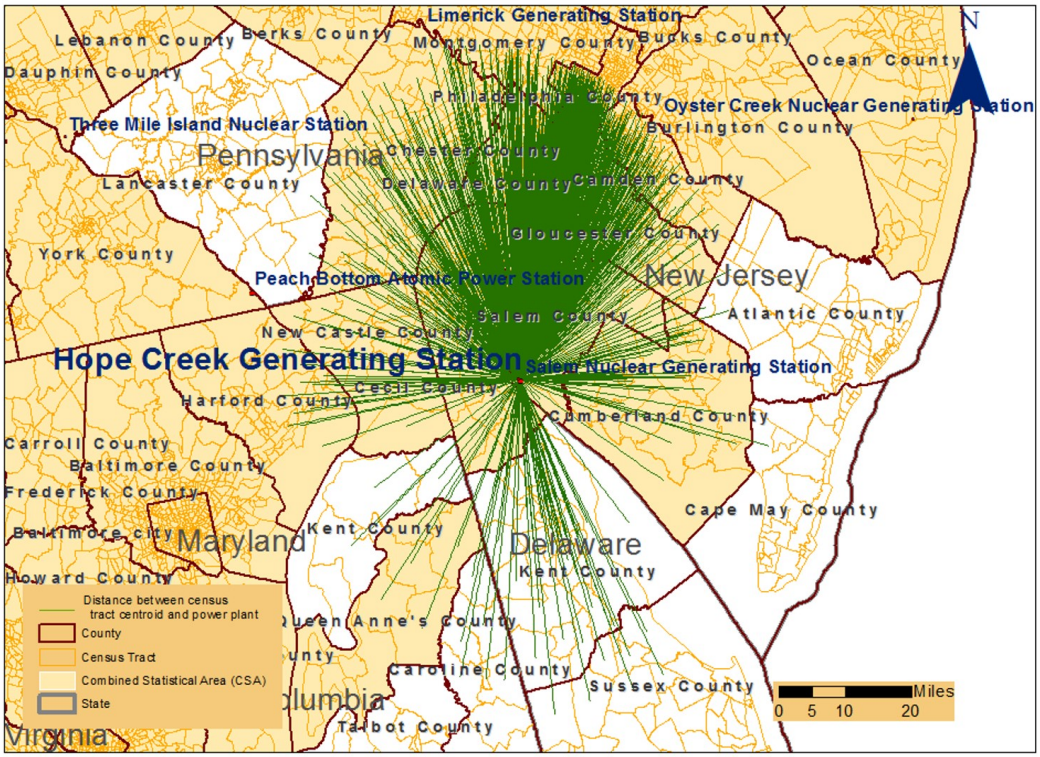

Figure B. 35 Distance to census-tract center points of census tracts within a 50-mile radius of Hope Creek Generating Station, New Jersey in 1990, 2000, and 2010

Table B. 69

Demographic Composition of Population, as sorted by Distance from Hope Creek Generating Station, New Jersey in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	15	99	188	398	397	1,097	5,755
Tract area (sq. mile)	332	848	1,870	1,653	982	5,684	63,987
Total population	34,738	325,339	650,001	1,509,343	1,533,210	4,052,631	21,006,748
White	26,049	267,177	518,830	1,150,923	916,694	2,879,673	17,710,736
Black	7,987	48,281	106,188	313,228	501,262	976,946	2,447,042
Asian	84	4,030	7,329	32,446	36,439	80,328	470,992
Native American	195	1,590	1,675	2,893	3,206	9,559	37,510
Others	436	4,250	15,972	9,857	75,608	106,123	340,396
Hispanic	745	8,137	29,376	26,399	104,396	169,053	906,894
Color	8,919	61,688	143,035	372,107	639,329	1,225,078	3,809,682
White (%)	74.99	82.12	79.82	76.25	59.79	71.06	84.31
Black (%)	22.99	14.84	16.34	20.75	32.69	24.11	11.65
Asian (%)	0.24	1.24	1.13	2.15	2.38	1.98	2.24
Native American (%)	0.56	0.49	0.26	0.19	0.21	0.24	0.18
Others (%)	1.26	1.31	2.46	0.65	4.93	2.62	1.62
Hispanic (%)	2.14	2.50	4.52	1.75	6.81	4.17	4.32
Color (%)	25.68	18.96	22.01	24.65	41.70	30.23	18.14
Female (%)	49.36	51.39	51.77	51.98	53.18	52.33	51.74
Old (65 + years) (%)	11.86	10.72	12.32	13.60	13.69	13.18	13.91
Kid (< 5 years) (%)	8.96	8.88	8.91	8.54	9.02	8.81	8.14
Native-born (%)	98.26	96.87	96.30	95.35	94.63	95.38	92.93
Renter housing units (%)	30.02	29.00	27.68	29.50	31.40	29.92	29.17
Education (%)	10.36	15.11	22.28	20.25	23.75	21.41	21.86
Unemployment (%)	5.87	4.49	4.87	6.05	7.66	6.31	5.36
Poverty (%)	12.17	9.15	9.07	11.24	16.74	12.82	8.76
Mean household income ($)	58,742	63,687	73,575	65,371	69,621	68,084	71,689
Year 2000							
Total population	40,224	383,484	709,421	1,525,610	1,531,056	4,189,795	22,585,696
White	29,785	282,207	543,558	1,073,697	840,955	2,770,202	17,791,120
Black	8,705	72,859	117,520	349,576	513,013	1,061,673	2,894,328
Asian	485	7,311	13,372	54,540	54,175	129,883	803,103
Native American	196	1,703	2,536	3,194	4,365	11,994	44,266
Others	1,067	19,398	32,414	44,612	118,557	216,048	1,052,874
Hispanic	1,085	24,730	45,000	43,697	151,190	265,702	1,506,994
Color	10,870	111,838	185,101	471,678	735,636	1,515,123	5,522,464
White (%)	74.05	73.59	76.62	70.38	54.93	66.12	78.77
Black (%)	21.64	19.00	16.57	22.91	33.51	25.34	12.81
Asian (%)	1.21	1.91	1.88	3.57	3.54	3.10	3.56
Native American (%)	0.49	0.44	0.36	0.21	0.29	0.29	0.20
Others (%)	2.65	5.06	4.57	2.92	7.74	5.16	4.66
Hispanic (%)	2.70	6.45	6.34	2.86	9.87	6.34	6.67
Color (%)	27.02	29.16	26.09	30.92	48.05	36.16	24.45
Female (%)	49.04	50.85	51.57	52.16	53.08	52.25	51.57
Old (65 + years) (%)	10.23	10.57	12.63	13.54	13.15	12.94	14.13
Kid (< 5 years) (%)	8.76	8.16	7.87	7.66	8.11	7.92	7.60
Native-born (%)	96.97	94.25	94.79	93.50	92.82	93.57	89.91
Renter housing units (%)	24.46	28.56	25.96	29.79	32.45	29.99	28.20
College degree or higher (%)	16.76	19.11	27.10	24.28	28.36	25.70	26.70
Unemployment (%)	5.18	5.61	6.25	6.50	8.81	7.16	5.20
Poverty (%)	10.07	9.70	9.23	12.21	17.88	13.52	8.93
Mean household income ($)	69,448	68,663	81,529	70,201	73,843	73,276	78,009
Year 2010							
Total population	47,275	427,702	768,301	1,578,254	1,551,169	4,372,701	23,539,282
White	34,531	289,805	580,602	1,052,228	830,412	2,787,578	17,769,170
Black	10,020	100,007	130,603	385,252	507,839	1,133,721	3,240,060
Asian	914	14,427	20,250	75,950	72,566	184,107	1,187,353
Native American	167	1,863	2,476	2,891	3,727	11,124	46,053
Others	1,643	21,600	34,370	61,933	136,625	256,171	1,296,646
Hispanic	2,217	44,395	67,069	79,274	196,806	389,761	2,231,784
Color	13,744	165,952	229,283	565,115	790,951	1,765,045	6,974,797
White (%)	73.04	67.76	75.57	66.67	53.53	63.75	75.49

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	21.20	23.38	17.00	24.41	32.74	25.93	13.76
Asian (%)	1.93	3.37	2.64	4.81	4.68	4.21	5.04
Native American (%)	0.35	0.44	0.32	0.18	0.24	0.25	0.20
Others (%)	3.48	5.05	4.47	3.92	8.81	5.86	5.51
Hispanic (%)	4.69	10.38	8.73	5.02	12.69	8.91	9.48
Color (%)	29.07	38.80	29.84	35.81	50.99	40.37	29.63
Female (%)	47.94	51.08	51.51	51.85	52.80	52.01	51.29
Old (65 + years) (%)	10.70	10.83	13.13	12.82	12.69	12.61	14.15
Kid (< 5 years) (%)	6.41	6.90	6.35	6.24	6.54	6.44	6.01
Native-born (%)	95.99	90.38	92.84	91.43	90.66	91.35	87.58
Renter housing units (%)	16.46	27.33	24.29	29.56	32.92	29.57	26.88
College degree or higher (%)	22.34	22.21	30.56	29.34	33.10	30.12	31.00
Unemployment (%)	9.13	7.87	7.56	8.57	9.80	8.74	7.02
Poverty (%)	7.68	11.73	10.44	13.07	19.12	14.56	9.78
Mean household income ($)	80,515	68,452	85,014	73,582	75,545	75,854	81,038
Index	35	35	35	35	35	35	35

Table B. 70

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Hope Creek Generating Station, New Jersey

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	6852	1.05	5755	74.33	1097	62.86	11.47***	(10.92)
Black	6852	0.98	5755	15.00	1097	26.30	-11.30***	(-11.58)
Asian	6852	0.21	5755	4.49	1097	4.01	0.481*	(2.25)
Native American	6852	0.02	5755	0.20	1097	0.24	-0.0438*	(-2.25)
Others	6852	0.28	5755	5.36	1097	5.40	-0.0449	(-0.16)
Hispanic	6852	0.45	5755	9.11	1097	8.32	0.787	(1.74)
Color	6852	1.08	5755	29.93	1097	39.89	-9.962***	(-9.25)
White (2000)	6852	1.05	5755	77.92	1097	66.10	11.81***	(11.22)
Black	6852	0.98	5755	13.94	1097	25.28	-11.33***	(-11.58)
Asian	6852	0.17	5755	3.28	1097	3.03	0.252	(1.49)
Native American	6852	0.02	5755	0.21	1097	0.29	-0.0777***	(-4.67)
Others	6852	0.26	5755	4.56	1097	4.91	-0.345	(-1.31)
Hispanic	6852	0.38	5755	6.41	1097	5.93	0.472	(1.24)
Color	6852	1.08	5755	25.03	1097	35.59	-10.57***	(-9.81)
White (1990)	6852	1.03	5755	83.98	1097	72.98	11.01***	(10.69)
Black	6852	0.97	5755	11.95	1097	22.30	-10.35***	(-10.62)
Asian	6852	0.13	5755	2.14	1097	1.96	0.173	(1.37)
Native American	6852	0.02	5755	0.19	1097	0.24	-0.0488**	(-2.96)
Others	6852	0.23	5755	1.62	1097	2.26	-0.642**	(-2.74)
Hispanic	6852	0.31	5755	4.29	1097	3.77	0.526	(1.70)
Color	6852	1.04	5755	18.29	1097	28.01	-9.720***	(-9.39)

*p<0.05, **p<0.01, ***p<0.001

36. Oyster Creek Nuclear Generating Station, New Jersey

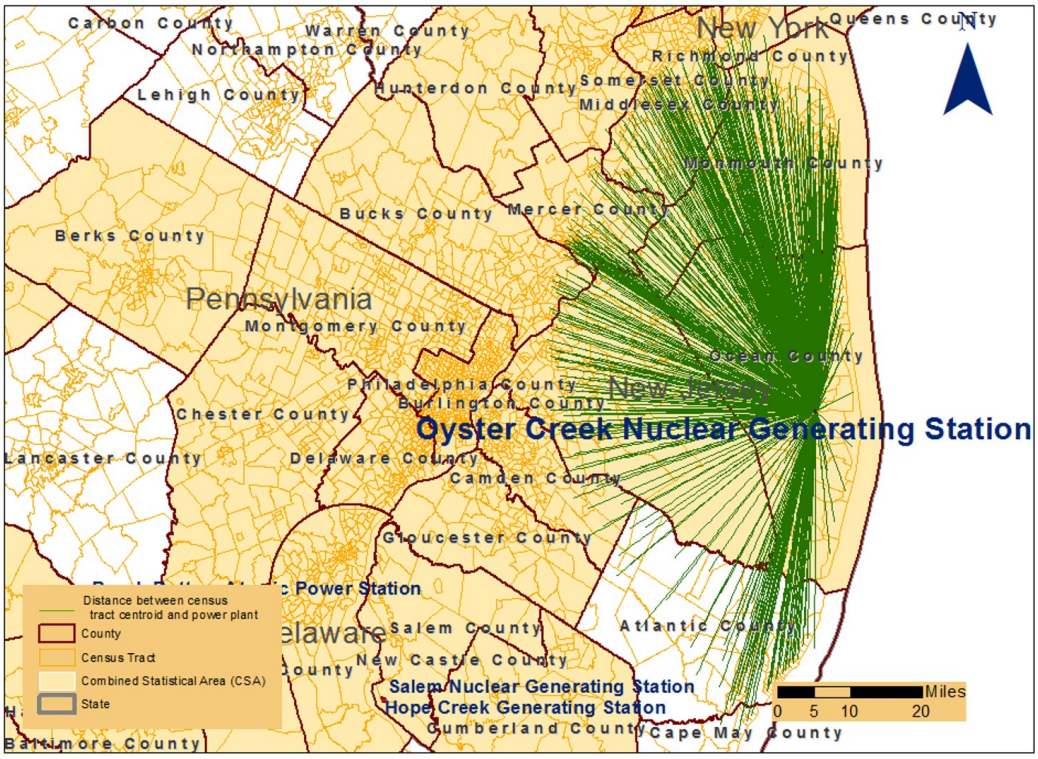

Figure B. 36 Distance to census-tract center points of census tracts within a 50-mile radius of Oyster Creek Nuclear Generating Station, New Jersey in 1990, 2000, and 2010

Table B. 71

Demographic Composition of Population, as sorted by Distance from Oyster Creek Nuclear Generating Station, New Jersey in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	29	70	86	237	161	583	9,564
Tract area (sq. mile)	287	760	787	1,008	570	3,412	105,920
Total population	91,665	237,253	335,439	843,941	624,342	2,132,640	35,469,420
White	89,171	227,599	299,980	684,923	523,233	1,824,906	28,231,784
Black	1,310	5,490	23,686	120,560	64,692	215,738	4,767,806
Asian	445	2,221	5,296	21,250	25,462	54,674	1,039,475
Native American	284	304	659	1,703	918	3,868	85,823
Others	457	1,635	5,821	15,501	10,020	33,434	1,344,511
Hispanic	2,092	5,849	16,672	37,725	29,157	91,495	3,001,051
Color	4,095	13,689	45,483	177,475	118,250	358,992	8,587,946
White (%)	97.28	95.93	89.43	81.16	83.81	85.57	79.59
Black (%)	1.43	2.31	7.06	14.29	10.36	10.12	13.44
Asian (%)	0.49	0.94	1.58	2.52	4.08	2.56	2.93
Native American (%)	0.31	0.13	0.20	0.20	0.15	0.18	0.24
Others (%)	0.50	0.69	1.74	1.84	1.60	1.57	3.79
Hispanic (%)	2.28	2.47	4.97	4.47	4.67	4.29	8.46
Color (%)	4.47	5.77	13.56	21.03	18.94	16.83	24.21
Female (%)	51.88	53.44	50.94	51.63	51.24	51.62	52.04
Old (65 + years) (%)	16.81	29.28	12.64	13.18	11.48	14.54	13.85
Kid (< 5 years) (%)	8.67	6.41	9.40	8.30	8.48	8.33	8.17
Native-born (%)	95.46	93.69	94.47	93.14	90.67	92.78	88.63
Renter housing units (%)	11.29	10.34	23.21	26.06	27.70	23.05	36.72
Education (%)	13.55	15.09	20.12	24.41	27.90	23.18	21.76
Unemployment (%)	6.25	5.84	5.12	4.90	5.08	5.13	6.43
Poverty (%)	6.02	5.03	5.90	6.13	5.57	5.80	11.63
Mean household income ($)	65,149	63,752	76,608	82,080	89,603	80,406	70,261
Year 2000							
Total population	114,293	263,512	378,078	954,033	677,090	2,387,006	37,284,856
White	109,595	245,123	332,045	718,669	518,696	1,924,128	27,552,606
Black	1,773	7,186	22,581	137,758	72,571	241,869	5,083,308
Asian	799	4,201	7,574	41,148	54,148	107,870	1,649,311
Native American	198	562	603	1,874	821	4,058	112,754
Others	1,935	6,437	15,286	54,589	30,827	109,074	2,886,883
Hispanic	3,834	11,064	25,065	77,961	45,460	163,384	4,209,902
Color	7,287	25,266	60,142	271,090	183,804	547,589	11,480,117
White (%)	95.89	93.02	87.82	75.33	76.61	80.61	73.90
Black (%)	1.55	2.73	5.97	14.44	10.72	10.13	13.63
Asian (%)	0.70	1.59	2.00	4.31	8.00	4.52	4.42
Native American (%)	0.17	0.21	0.16	0.20	0.12	0.17	0.30
Others (%)	1.69	2.44	4.04	5.72	4.55	4.57	7.74
Hispanic (%)	3.35	4.20	6.63	8.17	6.71	6.84	11.29
Color (%)	6.38	9.59	15.91	28.42	27.15	22.94	30.79
Female (%)	51.27	53.71	50.56	51.39	51.49	51.54	51.77
Old (65 + years) (%)	17.84	29.32	12.12	13.49	12.05	14.82	13.76
Kid (< 5 years) (%)	7.42	5.74	9.20	8.06	7.97	7.93	7.68
Native-born (%)	96.16	93.33	93.13	88.92	84.73	89.23	84.99
Renter housing units (%)	10.74	11.18	21.58	24.98	27.76	22.45	36.20
College degree or higher (%)	17.29	18.83	25.99	28.76	33.98	28.04	26.21
Unemployment (%)	5.13	5.12	5.23	4.94	5.99	5.33	6.43
Poverty (%)	5.85	5.65	7.07	7.29	6.37	6.74	12.53
Mean household income ($)	73,388	70,711	85,188	89,543	97,777	88,022	75,580
Year 2010							
Total population	128,893	280,778	414,445	1,011,867	702,567	2,538,550	38,025,484
White	119,722	255,716	361,170	731,620	496,127	1,964,355	27,334,152
Black	2,072	9,461	23,916	147,076	77,463	259,988	5,253,896
Asian	1,616	5,631	9,479	65,377	93,761	175,864	2,257,388
Native American	101	250	439	1,771	2,358	4,919	99,845
Others	5,382	9,720	19,441	66,023	32,858	133,424	3,080,202
Hispanic	8,519	19,856	34,215	120,065	64,939	247,594	5,165,970
Color	13,354	37,989	72,166	343,540	245,981	713,030	13,069,155
White (%)	92.88	91.07	87.15	72.30	70.62	77.38	71.88

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	1.61	3.37	5.77	14.54	11.03	10.24	13.82
Asian (%)	1.25	2.01	2.29	6.46	13.35	6.93	5.94
Native American (%)	0.08	0.09	0.11	0.18	0.34	0.19	0.26
Others (%)	4.18	3.46	4.69	6.52	4.68	5.26	8.10
Hispanic (%)	6.61	7.07	8.26	11.87	9.24	9.75	13.59
Color (%)	10.36	13.53	17.41	33.95	35.01	28.09	34.37
Female (%)	51.07	52.90	51.05	51.07	51.57	51.41	51.48
Old (65 + years) (%)	18.23	27.87	12.57	13.80	12.35	14.98	13.83
Kid (< 5 years) (%)	5.70	5.19	7.15	5.93	6.04	6.07	5.99
Native-born (%)	93.94	92.04	91.74	84.86	79.72	85.81	83.44
Renter housing units (%)	9.74	11.86	20.42	22.46	25.72	20.79	34.21
College degree or higher (%)	22.60	23.19	30.67	33.36	39.75	32.90	30.72
Unemployment (%)	8.07	8.41	7.57	7.23	7.71	7.58	7.50
Poverty (%)	6.32	7.43	9.31	7.67	6.91	7.62	12.85
Mean household income ($)	79,599	71,633	89,548	93,284	99,085	90,835	78,076
Index	36	36	36	36	36	36	36

Table B. 72 *Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Oyster Creek Nuclear Generating Station, New Jersey*

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	10147	1.04	9564	70.28	583	76.09	-5.810***	(-5.59)
Black	10147	0.80	9564	14.99	583	11.37	3.625***	(4.54)
Asian	10147	0.39	9564	5.71	583	6.12	-0.405	(-1.05)
Native American	10147	0.04	9564	0.32	583	0.20	0.121**	(3.29)
Others	10147	0.27	9564	7.72	583	5.20	2.527***	(9.30)
Hispanic	10147	0.48	9564	12.87	583	9.75	3.120***	(6.52)
Color	10147	1.09	9564	34.73	583	28.34	6.398***	(5.86)
White (2000)	10147	1.00	9564	72.81	583	79.55	-6.739***	(-6.73)
Black	10147	0.83	9564	14.67	583	11.08	3.589***	(4.34)
Asian	10147	0.26	9564	4.31	583	4.18	0.14	(0.54)
Native American	10147	0.03	9564	0.36	583	0.18	0.178***	(6.58)
Others	10147	0.26	9564	7.59	583	4.69	2.899***	(11.30)
Hispanic	10147	0.38	9564	10.77	583	6.99	3.781***	(10.06)
Color	10147	1.05	9564	31.20	583	23.64	7.560***	(7.21)
White (1990)	10147	0.93	9564	78.89	583	85.05	-6.159***	(-6.63)
Black	10147	0.83	9564	13.84	583	10.34	3.499***	(4.19)
Asian	10147	0.14	9564	2.87	583	2.50	0.379**	(2.70)
Native American	10147	0.03	9564	0.29	583	0.19	0.103***	(3.76)
Others	10147	0.16	9564	3.74	583	1.60	2.146***	(13.32)
Hispanic	10147	0.28	9564	8.37	583	4.26	4.113***	(14.82)
Color	10147	0.94	9564	24.53	583	16.95	7.583***	(8.05)

*p<0.05, **p<0.01, ***p<0.001

37. Salem Nuclear Generating Station, New Jersey

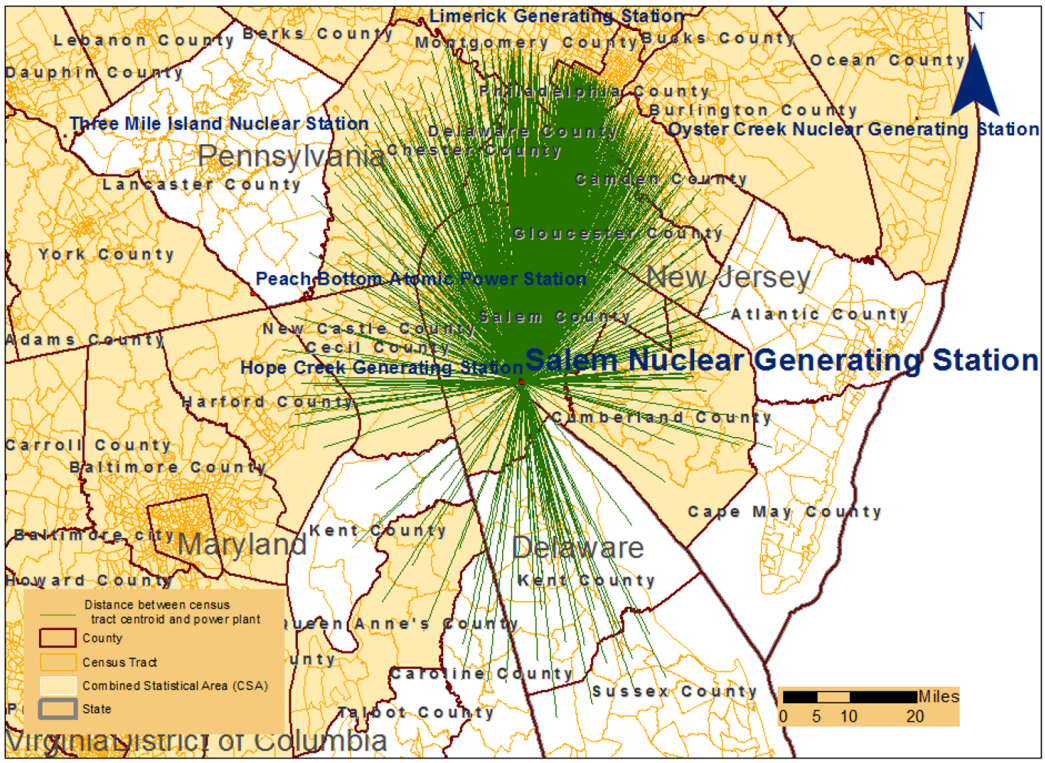

Figure B. 37 Distance to census-tract center points of census tracts within a 50-mile radius of Salem Nuclear Generating Station, New Jersey in 1990, 2000, and 2010

Table B. 73

Demographic Composition of Population, as sorted by Distance from Salem Nuclear Generating Station, New Jersey in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	15	93	189	386	405	1,088	5,764
Tract area (sq. mile)	332	845	1,857	1,673	1,008	5,715	63,957
Total population	34,738	307,326	653,350	1,471,049	1,545,323	4,011,786	21,047,592
White	26,049	254,777	519,515	1,137,890	903,351	2,841,582	17,748,828
Black	7,987	43,400	108,578	289,691	525,204	974,860	2,449,128
Asian	84	3,827	7,438	30,921	37,360	79,630	471,690
Native American	195	1,568	1,685	2,720	3,433	9,601	37,468
Others	436	3,746	16,128	9,828	75,967	106,105	340,414
Hispanic	745	7,385	29,586	26,039	105,050	168,805	907,142
Color	8,919	55,876	145,738	346,588	664,996	1,222,117	3,812,643
White (%)	74.99	82.90	79.52	77.35	58.46	70.83	84.33
Black (%)	22.99	14.12	16.62	19.69	33.99	24.30	11.64
Asian (%)	0.24	1.25	1.14	2.10	2.42	1.98	2.24
Native American (%)	0.56	0.51	0.26	0.18	0.22	0.24	0.18
Others (%)	1.26	1.22	2.47	0.67	4.92	2.64	1.62
Hispanic (%)	2.14	2.40	4.53	1.77	6.80	4.21	4.31
Color (%)	25.68	18.18	22.31	23.56	43.03	30.46	18.11
Female (%)	49.36	51.29	51.83	51.85	53.26	52.33	51.74
Old (65 + years) (%)	11.86	10.38	12.47	13.42	13.68	13.12	13.93
Kid (< 5 years) (%)	8.96	8.87	8.90	8.60	8.96	8.82	8.14
Native-born (%)	98.26	96.88	96.27	95.43	94.59	95.38	92.94
Renter housing units (%)	30.02	28.72	28.10	28.48	32.31	29.98	29.16
Education (%)	10.36	15.61	22.02	19.62	24.22	21.40	21.86
Unemployment (%)	5.87	4.37	4.90	5.96	7.81	6.34	5.35
Poverty (%)	12.17	8.83	9.27	10.90	17.16	12.91	8.75
Mean household income ($)	58,742	64,718	72,905	65,050	69,536	67,979	71,701
Year 2000							
Total population	40,224	364,904	710,302	1,492,038	1,540,413	4,147,881	22,627,608
White	29,785	271,716	539,851	1,064,490	831,336	2,737,178	17,824,144
Black	8,705	66,465	121,708	328,162	531,243	1,056,283	2,899,718
Asian	485	7,095	13,450	51,940	55,473	128,443	804,543
Native American	196	1,639	2,535	3,059	4,446	11,875	44,385
Others	1,067	17,987	32,735	44,397	117,908	214,094	1,054,828
Hispanic	1,085	22,527	46,285	43,337	150,064	263,298	1,509,398
Color	10,870	102,797	190,551	446,616	754,453	1,505,287	5,532,300
White (%)	74.05	74.46	76.00	71.34	53.97	65.99	78.77
Black (%)	21.64	18.21	17.13	21.99	34.49	25.47	12.81
Asian (%)	1.21	1.94	1.89	3.48	3.60	3.10	3.56
Native American (%)	0.49	0.45	0.36	0.21	0.29	0.29	0.20
Others (%)	2.65	4.93	4.61	2.98	7.65	5.16	4.66
Hispanic (%)	2.70	6.17	6.52	2.90	9.74	6.35	6.67
Color (%)	27.02	28.17	26.83	29.93	48.98	36.29	24.45
Female (%)	49.04	50.86	51.56	52.09	53.11	52.24	51.57
Old (65 + years) (%)	10.23	10.41	12.71	13.41	13.16	12.90	14.13
Kid (< 5 years) (%)	8.76	8.11	7.87	7.74	8.05	7.92	7.60
Native-born (%)	96.97	94.23	94.74	93.64	92.73	93.58	89.92
Renter housing units (%)	24.46	27.99	26.58	28.85	33.17	30.01	28.20
College degree or higher (%)	16.76	19.63	26.79	23.51	28.99	25.69	26.70
Unemployment (%)	5.18	5.40	6.40	6.42	8.79	7.15	5.20
Poverty (%)	10.07	9.25	9.47	11.89	18.25	13.58	8.93
Mean household income ($)	69,448	69,565	80,882	69,965	73,920	73,254	78,004
Year 2010							
Total population	47,275	410,475	764,726	1,552,122	1,553,871	4,328,469	23,583,514
White	34,531	280,389	572,330	1,048,911	823,884	2,760,045	17,796,704
Black	10,020	93,492	134,705	366,094	517,310	1,121,621	3,252,160
Asian	914	14,162	20,355	73,125	72,830	181,386	1,190,074
Native American	167	1,858	2,448	2,724	3,875	11,072	46,105
Others	1,643	20,574	34,888	61,268	135,972	254,345	1,298,472
Hispanic	2,217	41,275	68,759	79,979	195,236	387,466	2,234,079
Color	13,744	155,999	235,078	543,170	799,515	1,747,506	6,992,336
White (%)	73.04	68.31	74.84	67.58	53.02	63.76	75.46

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	21.20	22.78	17.61	23.59	33.29	25.91	13.79
Asian (%)	1.93	3.45	2.66	4.71	4.69	4.19	5.05
Native American (%)	0.35	0.45	0.32	0.18	0.25	0.26	0.20
Others (%)	3.48	5.01	4.56	3.95	8.75	5.88	5.51
Hispanic (%)	4.69	10.06	8.99	5.15	12.56	8.95	9.47
Color (%)	29.07	38.00	30.74	35.00	51.45	40.37	29.65
Female (%)	47.94	51.07	51.55	51.72	52.85	52.00	51.29
Old (65 + years) (%)	10.70	10.79	13.20	12.63	12.80	12.60	14.15
Kid (< 5 years) (%)	6.41	6.82	6.37	6.28	6.53	6.44	6.01
Native-born (%)	95.99	90.42	92.72	91.53	90.63	91.36	87.59
Renter housing units (%)	16.46	26.81	24.89	28.84	33.46	29.60	26.88
College degree or higher (%)	22.34	22.74	30.14	28.50	33.80	30.08	31.01
Unemployment (%)	9.13	7.72	7.72	8.49	9.83	8.75	7.03
Poverty (%)	7.68	11.19	10.85	12.76	19.43	14.62	9.78
Mean household income ($)	80,515	69,550	83,926	73,432	75,908	75,893	81,020
Index	37	37	37	37	37	37	37

Table B. 74

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Salem Nuclear Generating Station, New Jersey

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	6852	1.05	5764	74.32	1088	62.84	11.48***	(10.89)
Black	6852	0.98	5764	15.01	1088	26.32	-11.30***	(-11.53)
Asian	6852	0.21	5764	4.49	1088	3.99	0.501*	(2.33)
Native American	6852	0.02	5764	0.20	1088	0.24	-0.0454*	(-2.32)
Others	6852	0.29	5764	5.36	1088	5.42	-0.0621	(-0.22)
Hispanic	6852	0.46	5764	9.10	1088	8.36	0.743	(1.63)
Color	6852	1.08	5764	29.94	1088	39.93	-9.992***	(-9.25)
White (2000)	6852	1.06	5764	77.92	1088	65.97	11.95***	(11.29)
Black	6852	0.98	5764	13.93	1088	25.40	-11.47***	(-11.65)
Asian	6852	0.17	5764	3.28	1088	3.02	0.254	(1.50)
Native American	6852	0.02	5764	0.21	1088	0.29	-0.0778***	(-4.66)
Others	6852	0.27	5764	4.56	1088	4.91	-0.351	(-1.32)
Hispanic	6852	0.38	5764	6.40	1088	5.94	0.467	(1.22)
Color	6852	1.08	5764	25.02	1088	35.72	-10.70***	(-9.88)
White (1990)	6852	1.04	5764	84.00	1088	72.79	11.21***	(10.83)
Black	6852	0.98	5764	11.93	1088	22.46	-10.52***	(-10.74)
Asian	6852	0.13	5764	2.14	1088	1.97	0.169	(1.34)
Native American	6852	0.02	5764	0.19	1088	0.24	-0.0534**	(-3.15)
Others	6852	0.24	5764	1.62	1088	2.28	-0.664**	(-2.82)
Hispanic	6852	0.31	5764	4.29	1088	3.79	0.494	(1.59)
Color	6852	1.04	5764	18.27	1088	28.20	-9.930***	(-9.54)

*p<0.05, **p<0.01, ***p<0.001

38. Indian Point Nuclear Generating, New York

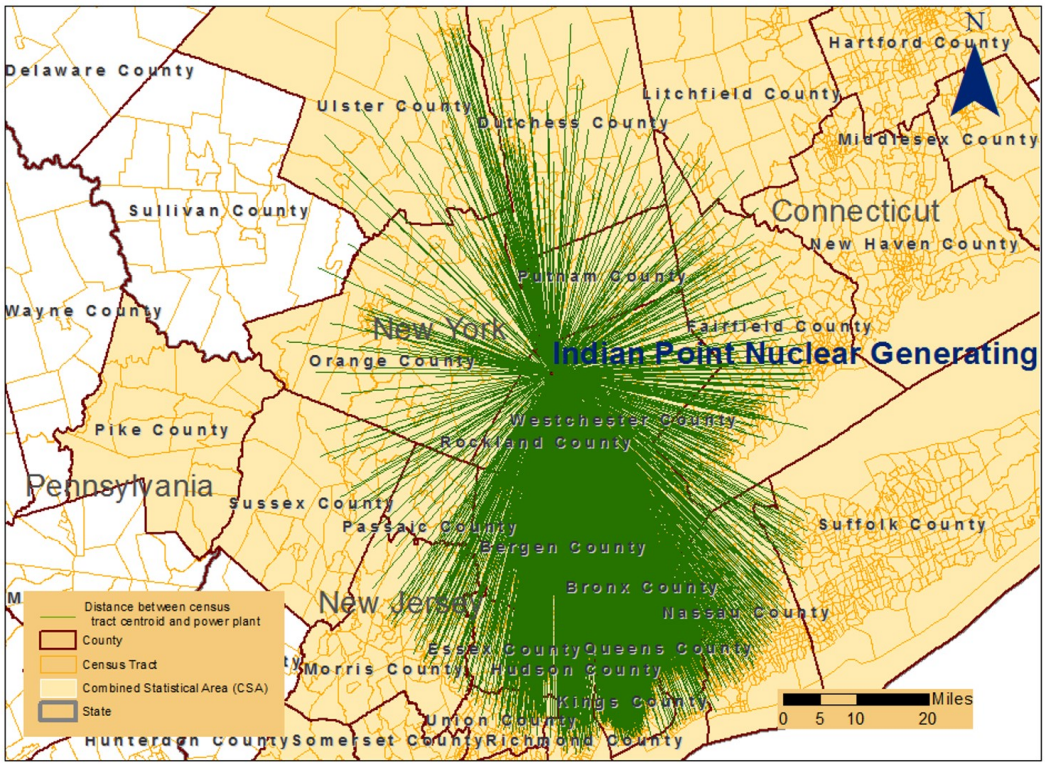

Figure B. 38 Distance to census-tract center points of census tracts within a 50-mile radius of Indian Point Nuclear Generating, New York in 1990, 2000, and 2010

Table B. 75
Demographic Composition of Population, as sorted by Distance from Indian Point Nuclear Generating, New York in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	55	187	596	1,252	1,670	3,760	4,002
Tract area (sq. mile)	292	1,005	1,487	1,919	1,107	5,810	63,011
Total population	229,882	749,366	2,453,297	4,911,005	5,442,748	13,786,298	15,221,250
White	201,501	647,849	1,855,732	3,162,924	3,096,381	8,964,387	13,431,768
Black	16,429	64,693	368,460	861,202	1,657,783	2,968,567	1,200,971
Asian	5,847	23,174	91,373	317,468	303,274	741,136	266,893
Native American	425	1,661	4,420	12,869	13,867	33,242	47,283
Others	5,669	11,994	133,340	556,475	371,457	1,078,935	274,366
Hispanic	18,731	43,014	324,710	1,214,297	825,975	2,426,727	648,859
Color	39,637	129,807	757,725	2,266,527	2,700,268	5,893,964	2,127,483
White (%)	87.65	86.45	75.64	64.40	56.89	65.02	88.24
Black (%)	7.15	8.63	15.02	17.54	30.46	21.53	7.89
Asian (%)	2.54	3.09	3.72	6.46	5.57	5.38	1.75
Native American (%)	0.18	0.22	0.18	0.26	0.25	0.24	0.31
Others (%)	2.47	1.60	5.44	11.33	6.82	7.83	1.80
Hispanic (%)	8.15	5.74	13.24	24.73	15.18	17.60	4.26
Color (%)	17.24	17.32	30.89	46.15	49.61	42.75	13.98
Female (%)	49.70	51.09	52.43	52.56	52.72	52.48	51.44
Old (65 + years) (%)	10.37	11.00	13.76	13.15	13.02	13.04	13.40
Kid (< 5 years) (%)	8.35	8.53	8.11	7.60	8.36	8.05	8.44
Native-born (%)	89.09	87.42	81.67	74.57	76.13	77.39	93.56
Renter housing units (%)	25.75	26.01	41.22	60.66	53.40	52.34	28.04
Education (%)	32.51	34.60	29.01	28.94	20.61	26.10	22.16
Unemployment (%)	3.96	4.35	5.61	7.72	8.14	7.23	5.62
Poverty (%)	5.02	6.38	7.89	16.16	15.07	13.55	8.41
Mean household income ($)	103,352	113,938	97,399	82,528	70,724	82,538	72,323
Year 2000							
Total population	242,165	826,902	2,627,286	5,352,294	5,845,359	14,894,006	15,902,366
White	196,235	673,908	1,759,588	3,040,855	2,825,575	8,496,161	13,272,190
Black	17,902	70,385	410,274	800,710	1,750,064	3,049,335	1,370,075
Asian	8,780	34,826	130,263	500,998	486,427	1,161,294	459,169
Native American	431	2,370	7,084	23,711	18,208	51,804	54,916
Others	18,804	45,422	320,086	985,956	765,109	2,135,377	746,051
Hispanic	30,788	77,568	495,739	1,592,978	1,054,119	3,251,192	1,048,920
Color	61,284	195,385	1,073,881	2,944,270	3,443,913	7,718,733	3,123,957
White (%)	81.03	81.50	66.97	56.81	48.34	57.04	83.46
Black (%)	7.39	8.51	15.62	14.96	29.94	20.47	8.62
Asian (%)	3.63	4.21	4.96	9.36	8.32	7.80	2.89
Native American (%)	0.18	0.29	0.27	0.44	0.31	0.35	0.35
Others (%)	7.76	5.49	12.18	18.42	13.09	14.34	4.69
Hispanic (%)	12.71	9.38	18.87	29.76	18.03	21.83	6.60
Color (%)	25.31	23.63	40.87	55.01	58.92	51.82	19.64
Female (%)	50.78	50.92	52.31	52.01	52.58	52.20	51.32
Old (65 + years) (%)	11.52	11.93	13.10	12.21	12.12	12.31	13.84
Kid (< 5 years) (%)	8.73	8.92	8.43	7.62	8.39	8.16	7.68
Native-born (%)	85.06	84.71	76.46	68.28	68.34	70.93	91.29
Renter housing units (%)	25.56	26.47	41.05	60.63	53.30	52.23	27.18
College degree or higher (%)	38.04	39.90	33.57	33.57	25.04	30.72	26.40
Unemployment (%)	3.56	4.01	5.68	8.10	8.42	7.47	5.67
Poverty (%)	6.01	7.92	10.23	17.31	17.28	15.35	9.17
Mean household income ($)	109,993	123,688	103,111	89,616	74,011	88,163	77,552
Year 2010							
Total population	253,977	866,039	2,685,808	5,416,986	5,895,371	15,118,181	16,378,985
White	196,989	679,057	1,697,802	2,981,212	2,799,672	8,354,732	13,279,606
Black	21,031	75,492	428,486	765,664	1,716,532	3,007,205	1,502,391
Asian	12,594	45,390	166,660	646,636	662,158	1,533,438	695,603
Native American	261	1,937	5,135	17,716	16,853	41,902	52,616
Others	23,102	64,163	387,725	1,005,758	700,156	2,180,904	848,769
Hispanic	48,788	114,365	622,117	1,732,926	1,182,057	3,700,253	1,503,914
Color	83,856	244,517	1,238,828	3,138,954	3,625,473	8,331,628	3,940,985
White (%)	77.56	78.41	63.21	55.03	47.49	55.26	81.08

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	8.28	8.72	15.95	14.13	29.12	19.89	9.17
Asian (%)	4.96	5.24	6.21	11.94	11.23	10.14	4.25
Native American (%)	0.10	0.22	0.19	0.33	0.29	0.28	0.32
Others (%)	9.10	7.41	14.44	18.57	11.88	14.43	5.18
Hispanic (%)	19.21	13.21	23.16	31.99	20.05	24.48	9.18
Color (%)	33.02	28.23	46.12	57.95	61.50	55.11	24.06
Female (%)	49.24	51.22	51.94	51.90	52.29	51.98	51.10
Old (65 + years) (%)	12.80	13.01	13.16	12.55	12.00	12.47	14.14
Kid (< 5 years) (%)	5.96	6.82	6.38	6.07	6.62	6.38	5.78
Native-born (%)	80.58	82.49	74.88	66.85	66.66	69.33	89.09
Renter housing units (%)	22.67	24.79	38.10	56.15	49.51	48.41	25.33
College degree or higher (%)	40.49	43.98	37.58	39.18	30.93	36.01	30.52
Unemployment (%)	6.00	5.55	7.45	8.29	8.35	7.97	7.26
Poverty (%)	7.08	8.73	10.30	16.31	15.63	14.39	10.14
Mean household income ($)	111,702	124,939	105,091	93,828	78,343	91,901	79,841
Index	38	38	38	38	38	38	38

Table B. 76

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Indian Point Nuclear Generating, New York

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	7762	0.64	4002	79.62	3760	53.11	26.51***	(41.41)
Black	7762	0.54	4002	9.94	3760	21.55	-11.61***	(-21.38)
Asian	7762	0.24	4002	3.81	3760	10.09	-6.280***	(-25.68)
Native American	7762	0.06	4002	0.45	3760	0.30	0.151*	(2.57)
Others	7762	0.27	4002	5.24	3760	13.68	-8.443***	(-31.12)
Hispanic	7762	0.42	4002	9.09	3760	23.29	-14.20***	(-34.16)
Color	7762	0.68	4002	24.42	3760	55.67	-31.25***	(-45.80)
White (2000)	7762	0.64	4002	82.44	3760	55.23	27.21***	(42.64)
Black	7762	0.55	4002	9.25	3760	22.17	-12.92***	(-23.35)
Asian	7762	0.19	4002	2.68	3760	7.80	-5.122***	(-26.93)
Native American	7762	0.06	4002	0.43	3760	0.40	0.0312	(0.55)
Others	7762	0.27	4002	4.82	3760	14.09	-9.265***	(-34.13)
Hispanic	7762	0.39	4002	6.67	3760	20.94	-14.27***	(-36.45)
Color	7762	0.68	4002	20.20	3760	52.57	-32.36***	(-47.25)
White (1990)	7762	0.64	4002	87.57	3760	63.93	23.64***	(36.79)
Black	7762	0.57	4002	8.06	3760	22.36	-14.30***	(-25.01)
Asian	7762	0.13	4002	1.71	3760	5.24	-3.536***	(-27.09)
Native American	7762	0.06	4002	0.42	3760	0.24	0.176**	(3.16)
Others	7762	0.21	4002	1.81	3760	7.71	-5.902***	(-28.30)
Hispanic	7762	0.36	4002	4.26	3760	17.33	-13.07***	(-36.79)
Color	7762	0.67	4002	14.17	3760	43.30	-29.12***	(-43.16)

*p<0.05, **p<0.01, ***p<0.001

39. James A. FitzPatrick Nuclear Power Plant, New York

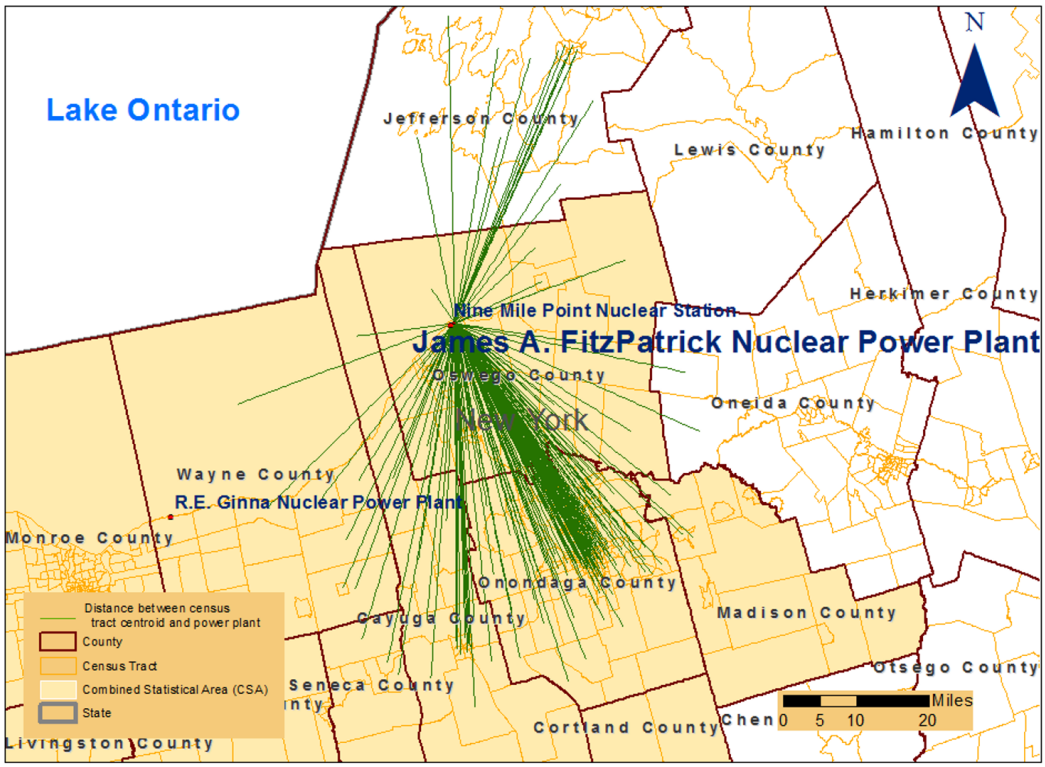

Figure B. 39 Distance to census-tract center points of census tracts within a 50-mile radius of James A. FitzPatrick Nuclear Power Plant, New York in 1990, 2000, and 2010

Table B. 77

Demographic Composition of Population, as sorted by Distance from James A. FitzPatrick Nuclear Power Plant, New York in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	9	16	31	115	41	212	4,707
Tract area (sq. mile)	374	658	1,451	1,844	611	4,938	49,616
Total population	30,260	66,188	121,603	397,569	141,586	757,206	17,233,108
White	29,760	65,244	118,190	349,634	135,091	697,919	12,699,958
Black	182	324	1,734	36,763	4,012	43,015	2,817,577
Asian	173	284	727	5,582	1,156	7,922	681,344
Native American	98	223	697	2,909	811	4,738	54,341
Others	47	116	267	2,675	516	3,621	979,897
Hispanic	320	437	1,092	6,065	1,427	9,341	2,142,401
Color	752	1,244	4,254	50,977	7,298	64,525	5,436,296
White (%)	98.35	98.57	97.19	87.94	95.41	92.17	73.70
Black (%)	0.60	0.49	1.43	9.25	2.83	5.68	16.35
Asian (%)	0.57	0.43	0.60	1.40	0.82	1.05	3.95
Native American (%)	0.32	0.34	0.57	0.73	0.57	0.63	0.32
Others (%)	0.16	0.18	0.22	0.67	0.36	0.48	5.69
Hispanic (%)	1.06	0.66	0.90	1.53	1.01	1.23	12.43
Color (%)	2.49	1.88	3.50	12.82	5.15	8.52	31.55
Female (%)	51.89	50.95	50.41	52.01	51.72	51.60	52.13
Old (65 + years) (%)	13.44	10.16	8.18	13.63	15.21	12.74	13.15
Kid (< 5 years) (%)	9.02	9.31	10.34	8.74	8.96	9.10	8.27
Native-born (%)	98.06	98.16	97.66	95.39	96.53	96.32	83.61
Renter housing units (%)	32.65	22.43	16.31	36.40	29.72	30.59	44.51
Education (%)	18.41	11.65	19.08	20.18	23.84	19.97	23.26
Unemployment (%)	7.87	8.75	4.90	6.31	6.16	6.30	6.91
Poverty (%)	15.38	11.02	6.25	12.47	8.88	10.76	13.13
Mean household income ($)	53,774	55,410	65,701	55,782	65,934	59,114	73,010
Year 2000							
Total population	29,878	66,826	130,812	374,975	143,031	745,522	18,230,936
White	28,683	64,949	124,952	311,921	130,787	661,292	12,229,826
Black	113	435	2,081	39,869	4,994	47,492	2,938,750
Asian	304	157	965	7,671	2,275	11,372	1,040,954
Native American	102	216	626	2,601	1,666	5,211	74,103
Others	676	1,076	2,202	12,907	3,309	20,170	1,947,287
Hispanic	620	655	1,378	10,565	2,278	15,496	2,849,520
Color	1,461	2,211	6,599	67,432	13,319	91,022	7,123,756
White (%)	96.00	97.19	95.52	83.18	91.44	88.70	67.08
Black (%)	0.38	0.65	1.59	10.63	3.49	6.37	16.12
Asian (%)	1.02	0.23	0.74	2.05	1.59	1.53	5.71
Native American (%)	0.34	0.32	0.48	0.69	1.16	0.70	0.41
Others (%)	2.26	1.61	1.68	3.44	2.31	2.71	10.68
Hispanic (%)	2.08	0.98	1.05	2.82	1.59	2.08	15.63
Color (%)	4.89	3.31	5.04	17.98	9.31	12.21	39.08
Female (%)	51.69	50.72	50.64	52.02	51.46	51.54	51.88
Old (65 + years) (%)	13.77	10.75	9.83	14.45	15.84	13.55	12.89
Kid (< 5 years) (%)	6.95	7.80	8.21	7.69	7.54	7.73	7.87
Native-born (%)	97.77	98.69	97.27	94.51	95.75	95.74	78.96
Renter housing units (%)	33.73	21.30	16.77	35.22	28.94	29.56	43.81
College degree or higher (%)	18.46	13.14	23.36	22.55	28.79	22.98	27.55
Unemployment (%)	8.35	10.96	4.62	6.22	5.12	6.22	7.13
Poverty (%)	18.77	12.97	7.24	14.90	9.98	12.57	14.67
Mean household income ($)	53,246	56,785	69,001	58,249	69,951	61,978	77,711
Year 2010							
Total population	29,580	66,955	132,151	373,620	145,161	747,467	18,482,284
White	28,357	64,615	125,152	301,879	131,131	651,134	12,113,268
Black	388	648	2,561	45,876	6,166	55,639	2,934,952
Asian	422	328	1,823	10,353	2,967	15,893	1,381,821
Native American	69	109	452	2,412	1,063	4,105	62,771
Others	344	1,255	2,163	13,100	3,834	20,696	1,989,473
Hispanic	943	1,259	2,084	16,013	3,450	23,749	3,265,131
Color	1,925	3,040	8,339	81,394	15,808	110,506	7,744,309
White (%)	95.87	96.51	94.70	80.80	90.33	87.11	65.54

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	1.31	0.97	1.94	12.28	4.25	7.44	15.88
Asian (%)	1.43	0.49	1.38	2.77	2.04	2.13	7.48
Native American (%)	0.23	0.16	0.34	0.65	0.73	0.55	0.34
Others (%)	1.16	1.87	1.64	3.51	2.64	2.77	10.76
Hispanic (%)	3.19	1.88	1.58	4.29	2.38	3.18	17.67
Color (%)	6.51	4.54	6.31	21.79	10.89	14.78	41.90
Female (%)	51.59	49.71	50.61	51.56	50.77	51.07	51.66
Old (65 + years) (%)	13.17	11.83	11.48	14.18	15.70	13.75	13.27
Kid (< 5 years) (%)	5.31	5.77	5.78	6.02	5.63	5.85	6.03
Native-born (%)	97.69	97.92	96.69	93.30	95.70	94.95	77.59
Renter housing units (%)	31.23	21.20	17.05	33.76	27.97	28.56	40.60
College degree or higher (%)	20.37	14.46	26.79	25.86	31.07	25.90	32.38
Unemployment (%)	10.42	10.16	6.12	7.49	6.17	7.32	7.53
Poverty (%)	18.87	15.70	7.50	16.67	11.47	13.99	14.17
Mean household income ($)	56,009	56,240	71,278	57,132	70,169	62,051	81,148
Index	39	39	39	39	39	39	39

Table B. 78

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding James A. FitzPatrick Nuclear Power Plant, New York

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	4919	1.74	4707	63.64	212	82.19	-18.55***	(-10.67)
Black	4919	1.28	4707	16.99	212	9.50	7.490***	(5.85)
Asian	4919	0.32	4707	7.41	212	2.35	5.057***	(15.98)
Native American	4919	0.48	4707	0.43	212	1.08	-0.646	(-1.35)
Others	4919	0.31	4707	10.11	212	3.00	7.115***	(22.88)
Hispanic	4919	0.45	4707	16.61	212	3.59	13.01***	(28.92)
Color	4919	1.66	4707	42.09	212	18.08	24.01***	(14.45)
White (2000)	4919	1.56	4707	65.78	212	85.45	-19.68***	(-12.58)
Black	4919	1.25	4707	17.18	212	8.31	8.863***	(7.07)
Asian	4919	0.32	4707	5.70	212	1.90	3.797***	(11.81)
Native American	4919	0.25	4707	0.50	212	0.88	-0.382	(-1.55)
Others	4919	0.37	4707	10.43	212	3.22	7.214***	(19.53)
Hispanic	4919	0.43	4707	14.83	212	2.54	12.29***	(28.25)
Color	4919	1.51	4707	39.36	212	14.58	24.78***	(16.39)
White (1990)	4919	1.38	4707	72.47	212	90.47	-18.01***	(-13.08)
Black	4919	1.14	4707	17.03	212	6.31	10.72***	(9.43)
Asian	4919	0.30	4707	3.90	212	1.35	2.550***	(8.55)
Native American	4919	0.08	4707	0.40	212	0.67	-0.276***	(-3.62)
Others	4919	0.17	4707	5.59	212	0.50	5.091***	(29.39)
Hispanic	4919	0.38	4707	12.17	212	1.50	10.67***	(28.17)
Color	4919	1.27	4707	32.08	212	9.29	22.79***	(17.95)

*p<0.05, **p<0.01, ***p<0.001

40. Nine Mile Point Nuclear Station, New York

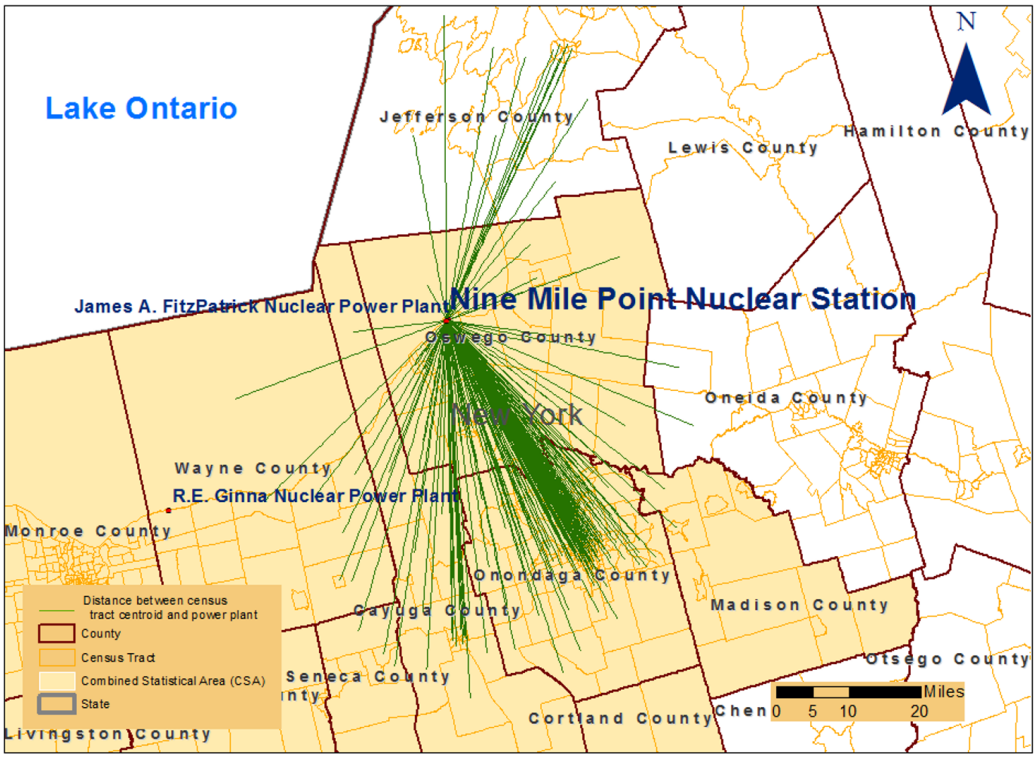

Figure B. 40 Distance to census-tract center points of census tracts within a 50-mile radius of Nine Mile Point Nuclear Station, New York in 1990, 2000, and 2010

Table B. 79 *Demographic Composition of Population, as sorted by Distance from Nine Mile Point Nuclear Station, New York in 1990, 2000, and 2010*

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	9	16	32	112	42	211	4,708
Tract area (sq. mile)	374	658	1,480	1,810	585	4,908	49,647
Total population	30,260	66,188	125,097	383,940	148,776	754,261	17,236,052
White	29,760	65,244	121,632	336,899	141,450	694,985	12,702,892
Black	182	324	1,758	36,190	4,561	43,015	2,817,577
Asian	173	284	745	5,433	1,287	7,922	681,344
Native American	98	223	697	2,852	857	4,727	54,352
Others	47	116	274	2,563	621	3,621	979,897
Hispanic	320	437	1,138	5,810	1,636	9,341	2,142,401
Color	752	1,244	4,353	49,941	8,224	64,514	5,436,307
White (%)	98.35	98.57	97.23	87.75	95.08	92.14	73.70
Black (%)	0.60	0.49	1.41	9.43	3.07	5.70	16.35
Asian (%)	0.57	0.43	0.60	1.42	0.87	1.05	3.95
Native American (%)	0.32	0.34	0.56	0.74	0.58	0.63	0.32
Others (%)	0.16	0.18	0.22	0.67	0.42	0.48	5.69
Hispanic (%)	1.06	0.66	0.91	1.51	1.10	1.24	12.43
Color (%)	2.49	1.88	3.48	13.01	5.53	8.55	31.54
Female (%)	51.89	50.95	50.37	52.06	51.75	51.61	52.13
Old (65 + years) (%)	13.44	10.16	8.16	13.72	15.16	12.76	13.15
Kid (< 5 years) (%)	9.02	9.31	10.32	8.67	9.08	9.10	8.27
Native-born (%)	98.06	98.16	97.68	95.34	96.48	96.31	83.62
Renter housing units (%)	32.65	22.43	16.15	36.40	30.91	30.64	44.51
Education (%)	18.41	11.65	19.06	20.20	23.75	19.99	23.26
Unemployment (%)	7.87	8.75	4.94	6.24	6.37	6.30	6.91
Poverty (%)	15.38	11.02	6.15	12.68	8.91	10.78	13.12
Mean household income ($)	53,774	55,410	65,848	55,736	65,074	59,090	73,009
Year 2000							
Total population	29,878	66,826	134,215	362,647	148,811	742,377	18,234,080
White	28,683	64,949	128,308	300,729	135,610	658,279	12,232,839
Black	113	435	2,081	39,364	5,499	47,492	2,938,750
Asian	304	157	965	7,501	2,426	11,353	1,040,973
Native American	102	216	657	2,536	1,661	5,172	74,142
Others	676	1,076	2,217	12,512	3,615	20,096	1,947,361
Hispanic	620	655	1,460	10,141	2,620	15,496	2,849,520
Color	1,461	2,211	6,714	66,060	14,444	90,890	7,123,888
White (%)	96.00	97.19	95.60	82.93	91.13	88.67	67.09
Black (%)	0.38	0.65	1.55	10.85	3.70	6.40	16.12
Asian (%)	1.02	0.23	0.72	2.07	1.63	1.53	5.71
Native American (%)	0.34	0.32	0.49	0.70	1.12	0.70	0.41
Others (%)	2.26	1.61	1.65	3.45	2.43	2.71	10.68
Hispanic (%)	2.08	0.98	1.09	2.80	1.76	2.09	15.63
Color (%)	4.89	3.31	5.00	18.22	9.71	12.24	39.07
Female (%)	51.69	50.72	50.59	52.07	51.48	51.55	51.88
Old (65 + years) (%)	13.77	10.75	9.85	14.52	15.83	13.57	12.89
Kid (< 5 years) (%)	6.95	7.80	8.16	7.67	7.62	7.73	7.87
Native-born (%)	97.77	98.69	97.29	94.45	95.68	95.73	78.96
Renter housing units (%)	33.73	21.30	16.62	35.19	30.10	29.60	43.80
College degree or higher (%)	18.46	13.14	23.27	22.65	28.37	22.97	27.55
Unemployment (%)	8.35	10.96	4.57	6.21	5.23	6.22	7.13
Poverty (%)	18.77	12.97	7.13	15.06	10.23	12.59	14.67
Mean household income ($)	53,246	56,785	69,176	58,246	68,871	61,943	77,710
Year 2010							
Total population	29,580	66,955	135,763	361,573	150,396	744,267	18,485,484
White	28,357	64,615	128,594	291,435	134,984	647,985	12,116,417
Black	388	648	2,571	45,191	6,841	55,639	2,934,952
Asian	422	328	1,906	10,037	3,192	15,885	1,381,829
Native American	69	109	460	2,398	1,069	4,105	62,771
Others	344	1,255	2,232	12,512	4,310	20,653	1,989,516
Hispanic	943	1,259	2,216	15,455	3,825	23,698	3,265,182
Color	1,925	3,040	8,621	79,584	17,249	110,419	7,744,396
White (%)	95.87	96.51	94.72	80.60	89.75	87.06	65.55
Black (%)	1.31	0.97	1.89	12.50	4.55	7.48	15.88

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Asian (%)	1.43	0.49	1.40	2.78	2.12	2.13	7.48
Native American (%)	0.23	0.16	0.34	0.66	0.71	0.55	0.34
Others (%)	1.16	1.87	1.64	3.46	2.87	2.77	10.76
Hispanic (%)	3.19	1.88	1.63	4.27	2.54	3.18	17.66
Color (%)	6.51	4.54	6.35	22.01	11.47	14.84	41.89
Female (%)	51.59	49.71	50.57	51.64	50.72	51.08	51.66
Old (65 + years) (%)	13.17	11.83	11.49	14.31	15.44	13.76	13.27
Kid (< 5 years) (%)	5.31	5.77	5.78	5.96	5.85	5.86	6.03
Native-born (%)	97.69	97.92	96.67	93.26	95.52	94.93	77.59
Renter housing units (%)	31.23	21.20	16.92	33.81	28.86	28.61	40.60
College degree or higher (%)	20.37	14.46	26.67	25.89	31.17	25.94	32.37
Unemployment (%)	10.42	10.16	6.03	7.54	6.32	7.34	7.53
Poverty (%)	18.87	15.70	7.46	16.90	11.66	14.04	14.17
Mean household income ($)	56,009	56,240	71,360	56,980	69,449	62,017	81,146
Index	40	40	40	40	40	40	40

Table B. 80

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Nine Mile Point Nuclear Station, New York

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	4919	1.75	4708	63.64	211	82.11	-18.47***	(-10.58)
Black	4919	1.28	4708	16.98	211	9.54	7.441***	(5.79)
Asian	4919	0.32	4708	7.41	211	2.36	5.045***	(15.90)
Native American	4919	0.48	4708	0.43	211	1.08	-0.652	(-1.35)
Others	4919	0.31	4708	10.11	211	3.01	7.105***	(22.79)
Hispanic	4919	0.45	4708	16.60	211	3.60	13.00***	(28.82)
Color	4919	1.67	4708	42.08	211	18.15	23.93***	(14.36)
White (2000)	4919	1.57	4708	65.78	211	85.40	-19.62***	(-12.49)
Black	4919	1.26	4708	17.17	211	8.35	8.820***	(7.01)
Asian	4919	0.32	4708	5.69	211	1.91	3.789***	(11.75)
Native American	4919	0.25	4708	0.50	211	0.88	-0.38	(-1.54)
Others	4919	0.37	4708	10.43	211	3.22	7.209***	(19.45)
Hispanic	4919	0.44	4708	14.83	211	2.56	12.27***	(28.15)
Color	4919	1.52	4708	39.35	211	14.62	24.72***	(16.29)
White (1990)	4919	1.38	4708	72.47	211	90.43	-17.96***	(-12.99)
Black	4919	1.14	4708	17.02	211	6.34	10.69***	(9.36)
Asian	4919	0.30	4708	3.90	211	1.35	2.543***	(8.50)
Native American	4919	0.08	4708	0.40	211	0.67	-0.277***	(-3.63)
Others	4919	0.17	4708	5.59	211	0.50	5.087***	(29.35)
Hispanic	4919	0.38	4708	12.17	211	1.51	10.66***	(28.09)
Color	4919	1.27	4708	32.08	211	9.33	22.74***	(17.85)

*p<0.05, **p<0.01, ***p<0.001

41. R.E. Ginna Nuclear Power Plant, New York

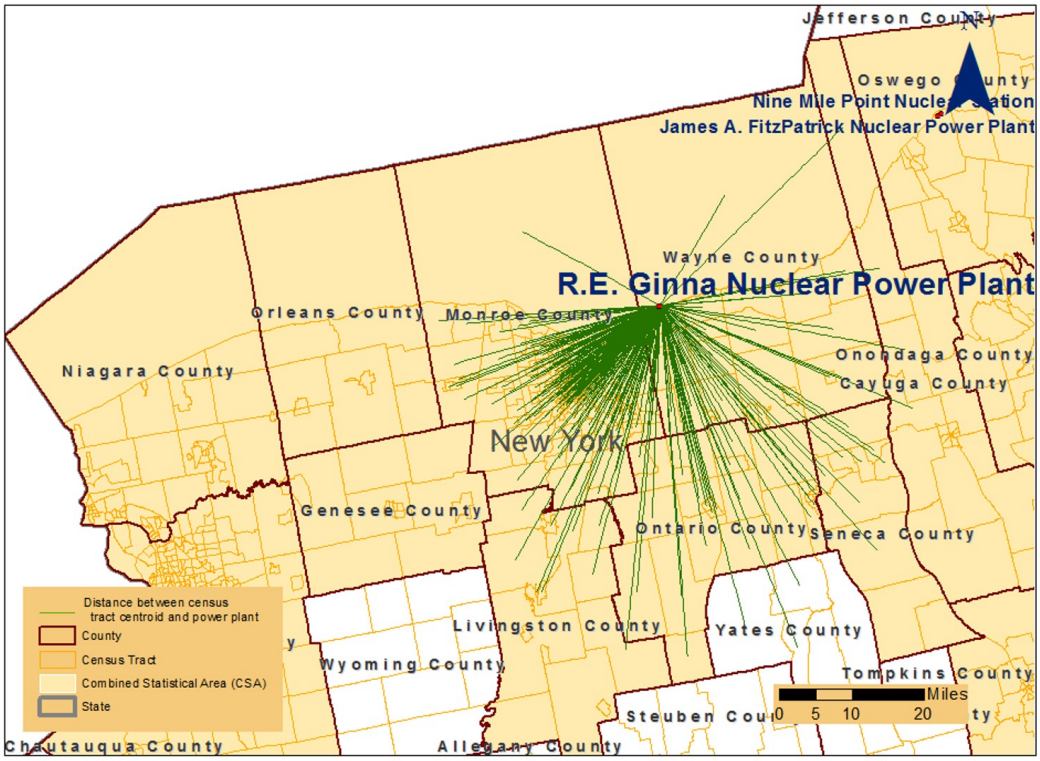

Figure B. 41 Distance to census-tract center points of census tracts within a 50-mile radius of R.E. Ginna Nuclear Power Plant, New York in 1990, 2000, and 2010

Table B. 81

Demographic Composition of Population, as sorted by Distance from R.E. Ginna Nuclear Power Plant, New York in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	13	155	56	32	8	264	4,655
Tract area (sq. mile)	139	1,264	1,527	1,098	487	4,515	50,040
Total population	49,871	556,467	228,991	118,552	33,211	987,092	17,003,222
White	48,507	453,285	217,993	114,729	32,176	866,690	12,531,187
Black	775	79,475	6,728	2,424	580	89,982	2,770,610
Asian	427	9,263	2,686	545	233	13,154	676,112
Native American	58	1,487	559	333	100	2,537	56,542
Others	100	12,965	1,019	528	125	14,737	968,781
Hispanic	495	22,563	3,434	1,245	380	28,117	2,123,625
Color	1,761	111,830	13,313	4,547	1,281	132,732	5,368,089
White (%)	97.26	81.46	95.20	96.78	96.88	87.80	73.70
Black (%)	1.55	14.28	2.94	2.04	1.75	9.12	16.29
Asian (%)	0.86	1.66	1.17	0.46	0.70	1.33	3.98
Native American (%)	0.12	0.27	0.24	0.28	0.30	0.26	0.33
Others (%)	0.20	2.33	0.44	0.45	0.38	1.49	5.70
Hispanic (%)	0.99	4.05	1.50	1.05	1.14	2.85	12.49
Color (%)	3.53	20.10	5.81	3.84	3.86	13.45	31.57
Female (%)	50.81	52.53	50.40	50.91	52.35	51.75	52.13
Old (65 + years) (%)	9.49	13.58	10.38	11.99	11.45	12.37	13.18
Kid (< 5 years) (%)	9.31	9.32	8.71	9.03	8.11	9.11	8.26
Native-born (%)	96.40	93.56	95.59	97.64	98.22	94.82	83.53
Renter housing units (%)	19.90	35.84	22.77	22.21	23.47	30.26	44.70
Education (%)	25.81	26.05	20.54	18.58	18.29	23.68	23.10
Unemployment (%)	3.98	5.60	4.02	5.28	5.91	5.11	6.99
Poverty (%)	3.47	12.09	6.03	8.52	13.64	9.86	13.21
Mean household income ($)	79,631	65,307	71,841	61,174	54,589	66,637	72,765
Year 2000							
Total population	59,508	555,306	250,746	121,854	32,772	1,020,186	17,956,272
White	56,473	416,290	231,935	115,490	31,269	851,457	12,039,661
Black	1,037	92,335	8,160	2,772	475	104,779	2,881,463
Asian	823	13,036	4,799	758	468	19,884	1,032,442
Native American	98	1,940	632	361	20	3,051	76,263
Others	1,068	31,716	5,215	2,462	545	41,006	1,926,451
Hispanic	849	35,111	5,051	2,534	507	44,052	2,820,964
Color	3,449	151,307	21,474	7,684	1,751	185,665	7,029,113
White (%)	94.90	74.97	92.50	94.78	95.41	83.46	67.05
Black (%)	1.74	16.63	3.25	2.27	1.45	10.27	16.05
Asian (%)	1.38	2.35	1.91	0.62	1.43	1.95	5.75
Native American (%)	0.16	0.35	0.25	0.30	0.06	0.30	0.42
Others (%)	1.79	5.71	2.08	2.02	1.66	4.02	10.73
Hispanic (%)	1.43	6.32	2.01	2.08	1.55	4.32	15.71
Color (%)	5.80	27.25	8.56	6.31	5.34	18.20	39.15
Female (%)	50.75	52.25	50.38	51.26	52.10	51.58	51.88
Old (65 + years) (%)	11.45	13.77	11.66	12.62	11.86	12.92	12.91
Kid (< 5 years) (%)	8.11	7.90	7.25	7.19	6.33	7.62	7.88
Native-born (%)	94.77	92.55	95.02	97.67	97.43	94.05	78.80
Renter housing units (%)	19.43	35.73	22.67	21.65	22.63	29.80	43.98
College degree or higher (%)	31.72	30.25	26.07	22.58	20.08	28.13	27.33
Unemployment (%)	3.62	6.13	5.26	6.00	6.26	5.74	7.18
Poverty (%)	4.05	13.35	6.20	8.48	14.11	10.49	14.82
Mean household income ($)	82,529	67,914	75,301	64,752	60,079	69,874	77,488
Year 2010							
Total population	65,466	547,508	262,996	123,563	35,681	1,035,214	18,194,538
White	61,862	401,996	237,087	116,892	33,023	850,860	11,913,542
Black	1,433	99,888	12,574	2,595	1,507	117,997	2,872,594
Asian	1,179	16,782	6,640	1,196	406	26,203	1,371,511
Native American	92	1,520	470	342	144	2,568	64,308
Others	900	27,322	6,225	2,538	601	37,586	1,972,583
Hispanic	1,293	44,871	8,011	3,615	1,118	58,908	3,229,972
Color	4,529	169,549	31,091	8,863	3,396	217,428	7,637,387
White (%)	94.49	73.42	90.15	94.60	92.55	82.19	65.48

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	2.19	18.24	4.78	2.10	4.22	11.40	15.79
Asian (%)	1.80	3.07	2.52	0.97	1.14	2.53	7.54
Native American (%)	0.14	0.28	0.18	0.28	0.40	0.25	0.35
Others (%)	1.37	4.99	2.37	2.05	1.68	3.63	10.84
Hispanic (%)	1.98	8.20	3.05	2.93	3.13	5.69	17.75
Color (%)	6.92	30.97	11.82	7.17	9.52	21.00	41.98
Female (%)	50.51	52.31	50.36	51.12	49.08	51.45	51.64
Old (65 + years) (%)	14.00	13.97	13.22	14.46	11.81	13.77	13.26
Kid (< 5 years) (%)	5.36	5.97	5.67	5.39	4.68	5.74	6.04
Native-born (%)	93.10	91.85	93.69	97.33	97.50	93.24	77.41
Renter housing units (%)	19.54	33.34	21.37	20.20	19.09	27.68	40.83
College degree or higher (%)	35.17	33.70	31.19	26.37	22.13	31.92	32.14
Unemployment (%)	4.07	7.74	6.47	5.76	6.23	6.87	7.56
Poverty (%)	4.86	16.57	7.72	10.54	15.99	12.84	14.24
Mean household income ($)	78,783	62,564	73,457	64,045	57,958	66,241	81,212
Index	41	41	41	41	41	41	41

Table B. 82

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding R.E. Ginna Nuclear Power Plant, New York

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	4919	1.81	4655	63.79	264	75.81	-12.02***	(-6.63)
Black	4919	1.47	4655	16.72	264	15.65	1.074	(0.73)
Asian	4919	0.28	4655	7.47	264	2.29	5.178***	(18.44)
Native American	4919	0.06	4655	0.47	264	0.26	0.207***	(3.55)
Others	4919	0.41	4655	10.11	264	4.48	5.634***	(13.72)
Hispanic	4919	0.69	4655	16.55	264	7.17	9.375***	(13.54)
Color	4919	1.90	4655	41.88	264	26.47	15.41***	(8.11)
White (2000)	4919	1.82	4655	65.99	264	77.87	-11.88***	(-6.53)
Black	4919	1.45	4655	16.93	264	14.33	2.606	(1.80)
Asian	4919	0.28	4655	5.73	264	1.99	3.747***	(13.52)
Native American	4919	0.06	4655	0.53	264	0.33	0.200***	(3.41)
Others	4919	0.51	4655	10.39	264	5.30	5.093***	(10.05)
Hispanic	4919	0.62	4655	14.79	264	5.76	9.030***	(14.57)
Color	4919	1.87	4655	39.14	264	23.31	15.83***	(8.45)
White (1990)	4919	1.65	4655	72.65	264	83.68	-11.03***	(-6.70)
Black	4919	1.39	4655	16.82	264	12.02	4.805***	(3.46)
Asian	4919	0.23	4655	3.92	264	1.46	2.462***	(10.56)
Native American	4919	0.05	4655	0.42	264	0.28	0.135*	(2.48)
Others	4919	0.32	4655	5.56	264	2.00	3.560***	(11.24)
Hispanic	4919	0.51	4655	12.16	264	3.78	8.381***	(16.51)
Color	4919	1.66	4655	31.90	264	17.00	14.90***	(8.97)

*p<0.05, **p<0.01, ***p<0.001

42. Brunswick Steam Electric Plant, North Carolina

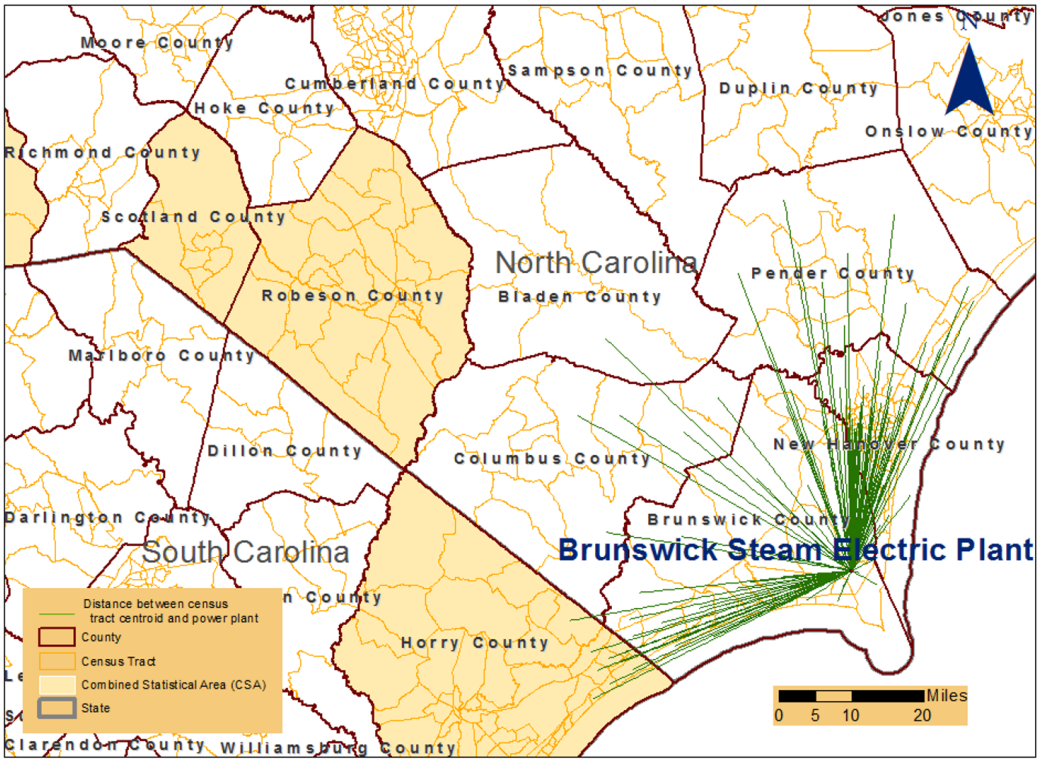

Figure B. 42 Distance to census-tract center points of census tracts within a 50-mile radius of Brunswick Steam Electric Plant, North Carolina in 1990, 2000, and 2010

Table B. 83

Demographic Composition of Population, as sorted by Distance from Brunswick Steam Electric Plant, North Carolina in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	11	31	34	24	8	108	3,190
Tract area (sq. mile)	160	579	625	912	764	3,040	82,799
Total population	13,649	71,422	83,925	41,652	21,689	232,337	9,882,965
White	12,374	59,685	62,338	30,490	11,682	176,569	7,242,354
Black	1,181	10,966	20,729	9,920	9,356	52,152	2,443,188
Asian	13	351	289	60	9	722	70,966
Native American	51	310	443	1,037	599	2,440	89,099
Others	29	109	125	145	44	452	37,369
Hispanic	58	450	545	268	94	1,415	95,933
Color	1,315	12,067	21,895	11,254	10,037	56,568	2,689,528
White (%)	90.66	83.57	74.28	73.20	53.86	76.00	73.28
Black (%)	8.65	15.35	24.70	23.82	43.14	22.45	24.72
Asian (%)	0.10	0.49	0.34	0.14	0.04	0.31	0.72
Native American (%)	0.37	0.43	0.53	2.49	2.76	1.05	0.90
Others (%)	0.21	0.15	0.15	0.35	0.20	0.19	0.38
Hispanic (%)	0.42	0.63	0.65	0.64	0.43	0.61	0.97
Color (%)	9.63	16.90	26.09	27.02	46.28	24.35	27.21
Female (%)	51.27	52.68	51.95	51.62	52.47	52.13	51.57
Old (65 + years) (%)	17.20	12.66	12.45	15.54	14.72	13.56	11.80
Kid (< 5 years) (%)	6.49	7.77	7.40	7.41	7.36	7.46	8.44
Native-born (%)	98.35	98.34	98.97	98.68	99.67	98.75	98.36
Renter housing units (%)	13.29	22.94	26.29	12.04	14.54	20.28	28.16
Education (%)	13.63	19.51	17.46	14.26	8.75	16.47	17.15
Unemployment (%)	7.04	5.45	5.62	6.33	5.94	5.79	5.04
Poverty (%)	12.29	13.54	15.71	16.58	22.30	15.61	13.76
Mean household income ($)	52,717	58,299	50,771	50,726	40,276	52,330	54,044
Year 2000							
Total population	18,639	98,916	112,072	60,380	26,766	316,773	11,744,552
White	17,173	83,477	84,383	46,394	14,776	246,203	8,251,640
Black	1,113	12,313	23,379	10,865	10,265	57,935	2,858,946
Asian	69	778	772	181	78	1,878	151,002
Native American	31	498	722	1,244	808	3,303	112,341
Others	232	1,858	2,826	1,683	848	7,447	370,630
Hispanic	187	1,928	3,272	2,003	709	8,099	457,693
Color	1,561	16,548	29,063	14,610	12,129	73,911	3,684,060
White (%)	92.13	84.39	75.29	76.84	55.20	77.72	70.26
Black (%)	5.97	12.45	20.86	17.99	38.35	18.29	24.34
Asian (%)	0.37	0.79	0.69	0.30	0.29	0.59	1.29
Native American (%)	0.17	0.50	0.64	2.06	3.02	1.04	0.96
Others (%)	1.24	1.88	2.52	2.79	3.17	2.35	3.16
Hispanic (%)	1.00	1.95	2.92	3.32	2.65	2.56	3.90
Color (%)	8.37	16.73	25.93	24.20	45.31	23.33	31.37
Female (%)	51.54	51.84	51.08	51.40	50.95	51.40	51.18
Old (65 + years) (%)	18.03	14.24	12.30	17.65	13.94	14.40	12.01
Kid (< 5 years) (%)	4.59	7.33	7.06	6.49	7.76	6.95	8.00
Native-born (%)	98.01	97.01	96.58	96.15	97.95	96.83	95.44
Renter housing units (%)	12.78	21.30	26.63	12.24	15.03	20.04	26.48
College degree or higher (%)	22.17	27.64	25.68	16.26	10.09	22.90	21.76
Unemployment (%)	3.33	4.74	6.23	4.91	6.89	5.40	5.50
Poverty (%)	8.95	11.14	15.32	12.67	19.91	13.49	12.87
Mean household income ($)	64,696	67,610	61,352	59,324	45,142	61,885	62,663
Year 2010							
Total population	28,812	125,531	138,154	80,437	29,461	402,395	13,380,211
White	26,509	102,598	106,478	64,888	17,535	318,008	9,169,719
Black	1,555	15,090	24,132	11,315	10,110	62,202	3,188,224
Asian	217	1,059	1,798	364	21	3,459	253,045
Native American	58	463	603	1,476	985	3,585	116,536
Others	473	6,321	5,143	2,394	810	15,141	652,687
Hispanic	569	6,224	7,265	3,220	1,472	18,750	913,412
Color	2,654	24,976	35,797	17,101	12,667	93,195	4,652,672
White (%)	92.01	81.73	77.07	80.67	59.52	79.03	68.53

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	5.40	12.02	17.47	14.07	34.32	15.46	23.83
Asian (%)	0.75	0.84	1.30	0.45	0.07	0.86	1.89
Native American (%)	0.20	0.37	0.44	1.83	3.34	0.89	0.87
Others (%)	1.64	5.04	3.72	2.98	2.75	3.76	4.88
Hispanic (%)	1.97	4.96	5.26	4.00	5.00	4.66	6.83
Color (%)	9.21	19.90	25.91	21.26	43.00	23.16	34.77
Female (%)	51.18	52.03	51.05	51.58	50.18	51.41	51.28
Old (65 + years) (%)	22.83	14.59	13.85	20.45	15.15	16.14	12.69
Kid (< 5 years) (%)	3.56	6.64	5.28	5.43	4.93	5.58	6.69
Native-born (%)	96.52	95.44	94.66	96.38	96.79	95.54	93.44
Renter housing units (%)	13.37	24.92	28.60	12.31	15.96	21.30	26.84
College degree or higher (%)	33.08	32.83	30.26	21.31	13.64	28.17	25.31
Unemployment (%)	8.14	7.91	8.66	7.98	10.14	8.35	8.93
Poverty (%)	10.50	13.02	17.63	11.55	20.53	14.64	15.85
Mean household income ($)	68,524	70,118	60,215	59,789	48,173	63,017	60,785
Index	42	42	42	42	42	42	42

Table B. 84 *Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Brunswick Steam Electric Plant, North Carolina*

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	3298	2.40	3190	67.44	108	75.86	-8.421***	(-3.51)
Black	3298	1.80	3190	24.14	108	15.45	8.688***	(4.82)
Asian	3298	0.13	3190	1.86	108	0.68	1.179***	(9.23)
Native American	3298	0.36	3190	0.84	108	0.99	-0.154	(-0.43)
Others	3298	0.39	3190	4.63	108	3.31	1.315**	(3.33)
Hispanic	3298	0.46	3190	6.46	108	4.25	2.215***	(4.78)
Color	3298	1.98	3190	34.60	108	22.61	11.99***	(6.07)
White (2000)	3298	2.13	3190	70.76	108	77.09	-6.332**	(-2.97)
Black	3298	1.93	3190	23.83	108	18.21	5.626**	(2.92)
Asian	3298	0.08	3190	1.33	108	0.55	0.779***	(9.25)
Native American	3298	0.30	3190	0.92	108	1.07	-0.148	(-0.50)
Others	3298	0.18	3190	3.05	108	2.22	0.836***	(4.54)
Hispanic	3298	0.24	3190	3.77	108	2.46	1.306***	(5.42)
Color	3298	2.03	3190	30.72	108	22.98	7.737***	(3.82)
White (1990)	3298	2.25	3190	75.07	108	76.69	-1.618	(-0.72)
Black	3298	2.10	3190	22.67	108	20.99	1.677	(0.80)
Asian	3298	0.06	3190	0.71	108	0.32	0.386***	(6.23)
Native American	3298	0.28	3190	0.85	108	0.88	-0.0327	(-0.12)
Others	3298	0.07	3190	0.35	108	0.23	0.12	(1.83)
Hispanic	3298	0.09	3190	0.93	108	0.69	0.236*	(2.58)
Color	3298	2.14	3190	25.08	108	22.73	2.352	(1.10)

*p<0.05, **p<0.01, ***p<0.001

43. McGuire Nuclear Station, North Carolina

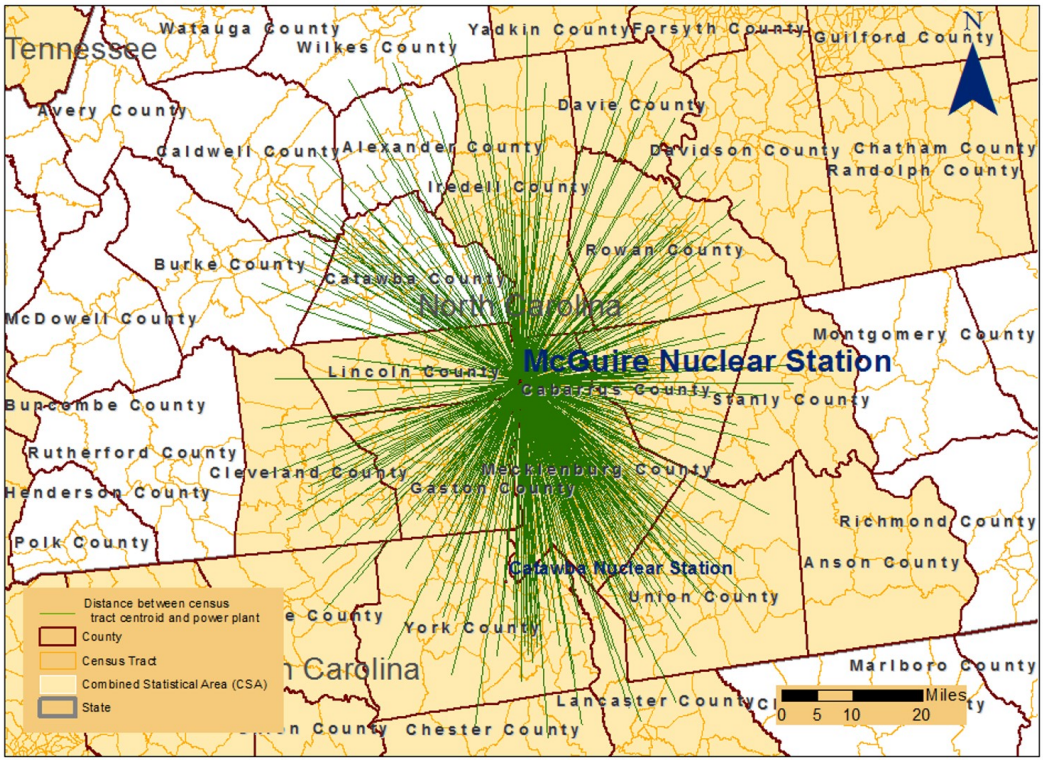

Figure B. 43 Distance to census-tract center points of census tracts within a 50-mile radius of McGuire Nuclear Station, North Carolina in 1990, 2000, and 2010

Table B. 85

Demographic Composition of Population, as sorted by Distance from McGuire Nuclear Station, North Carolina in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	47	219	186	125	36	613	2,685
Tract area (sq. mile)	322	923	1,573	2,057	1,491	6,366	79,474
Total population	61,535	546,470	508,186	391,233	128,988	1,636,412	8,478,890
White	54,050	391,448	442,955	327,287	113,863	1,329,603	6,089,320
Black	6,764	146,100	56,574	60,356	14,070	283,864	2,211,476
Asian	304	5,103	5,588	1,570	278	12,843	58,845
Native American	319	1,984	1,626	1,319	489	5,737	85,802
Others	93	1,832	1,463	696	292	4,376	33,445
Hispanic	352	4,844	4,341	2,107	747	12,391	84,957
Color	7,756	157,703	67,988	65,125	15,503	314,075	2,432,021
White (%)	87.84	71.63	87.16	83.66	88.27	81.25	71.82
Black (%)	10.99	26.74	11.13	15.43	10.91	17.35	26.08
Asian (%)	0.49	0.93	1.10	0.40	0.22	0.78	0.69
Native American (%)	0.52	0.36	0.32	0.34	0.38	0.35	1.01
Others (%)	0.15	0.34	0.29	0.18	0.23	0.27	0.39
Hispanic (%)	0.57	0.89	0.85	0.54	0.58	0.76	1.00
Color (%)	12.60	28.86	13.38	16.65	12.02	19.19	28.68
Female (%)	49.99	52.44	51.38	51.63	50.49	51.67	51.57
Old (65 + years) (%)	10.97	12.06	9.92	12.09	11.31	11.30	11.95
Kid (< 5 years) (%)	8.05	8.56	8.52	8.42	7.76	8.43	8.41
Native-born (%)	98.92	98.03	97.55	99.09	99.33	98.27	98.39
Renter housing units (%)	16.31	36.65	25.01	25.94	19.16	28.43	27.82
Education (%)	18.96	15.63	22.79	13.64	11.27	17.19	17.12
Unemployment (%)	3.52	4.60	3.30	4.27	3.66	3.99	5.28
Poverty (%)	6.45	12.36	6.40	10.11	9.26	9.49	14.65
Mean household income ($)	70,219	54,885	69,750	55,420	54,957	60,197	52,782
Year 2000							
Total population	117,264	661,218	659,306	478,606	156,105	2,072,499	9,988,826
White	102,010	432,402	534,841	389,554	136,304	1,595,111	6,902,732
Black	11,676	183,934	85,412	69,361	15,194	365,577	2,551,304
Asian	1,348	13,363	13,960	5,169	542	34,382	118,498
Native American	507	2,884	2,781	2,671	723	9,566	106,078
Others	1,717	28,642	22,314	11,857	3,342	67,872	310,205
Hispanic	2,503	40,194	30,988	16,073	5,154	94,912	370,880
Color	16,770	246,061	139,643	96,433	22,545	521,452	3,236,519
White (%)	86.99	65.39	81.12	81.39	87.32	76.97	69.10
Black (%)	9.96	27.82	12.95	14.49	9.73	17.64	25.54
Asian (%)	1.15	2.02	2.12	1.08	0.35	1.66	1.19
Native American (%)	0.43	0.44	0.42	0.56	0.46	0.46	1.06
Others (%)	1.46	4.33	3.38	2.48	2.14	3.27	3.11
Hispanic (%)	2.13	6.08	4.70	3.36	3.30	4.58	3.71
Color (%)	14.30	37.21	21.18	20.15	14.44	25.16	32.40
Female (%)	50.20	51.00	50.92	51.12	50.45	50.92	51.24
Old (65 + years) (%)	8.66	10.70	10.37	11.86	11.74	10.82	12.33
Kid (< 5 years) (%)	9.01	8.30	8.39	8.35	7.98	8.36	7.90
Native-born (%)	96.60	92.40	93.26	96.41	96.99	94.18	95.74
Renter housing units (%)	15.74	35.67	25.32	24.94	18.28	27.53	26.02
College degree or higher (%)	35.59	21.72	28.59	17.32	13.10	23.07	21.52
Unemployment (%)	3.50	5.96	3.90	5.20	4.51	4.87	5.64
Poverty (%)	4.39	11.67	7.54	10.34	9.46	9.46	13.61
Mean household income ($)	97,183	64,982	80,572	63,591	61,406	71,160	60,881
Year 2010							
Total population	188,937	782,274	784,185	585,783	176,671	2,517,850	11,264,756
White	145,604	479,941	601,362	467,712	151,042	1,845,661	7,642,066
Black	31,770	226,337	112,315	86,475	16,981	473,878	2,776,548
Asian	4,590	25,249	25,830	8,565	1,088	65,322	191,182
Native American	809	2,556	3,198	2,258	580	9,401	110,720
Others	6,164	48,191	41,480	20,773	6,980	123,588	544,240
Hispanic	9,622	79,836	70,926	33,962	9,135	203,481	728,681
Color	48,726	343,042	223,401	138,425	29,987	783,581	3,962,286
White (%)	77.06	61.35	76.69	79.84	85.49	73.30	67.84

Black (%)	16.82	28.93	14.32	14.76	9.61	18.82	24.65
Asian (%)	2.43	3.23	3.29	1.46	0.62	2.59	1.70
Native American (%)	0.43	0.33	0.41	0.39	0.33	0.37	0.98
Others (%)	3.26	6.16	5.29	3.55	3.95	4.91	4.83
Hispanic (%)	5.09	10.21	9.04	5.80	5.17	8.08	6.47
Color (%)	25.79	43.85	28.49	23.63	16.97	31.12	35.17
Female (%)	50.98	51.39	51.31	50.98	51.63	51.26	51.28
Old (65 + years) (%)	8.43	10.36	11.16	12.09	14.15	11.13	13.16
Kid (< 5 years) (%)	7.43	7.24	6.86	7.02	6.27	7.01	6.58
Native-born (%)	93.27	89.71	90.39	94.87	96.37	91.86	93.87
Renter housing units (%)	18.22	33.98	26.16	23.46	18.13	26.90	26.57
College degree or higher (%)	41.75	25.94	31.32	22.69	16.84	27.42	24.95
Unemployment (%)	6.40	10.78	8.05	9.15	8.82	9.08	8.87
Poverty (%)	7.00	15.92	11.07	13.90	14.03	13.13	16.43
Mean household income ($)	93,371	62,194	74,370	64,032	57,552	68,424	59,192
Index	43	43	43	43	43	43	43

Table B. 86

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding McGuire Nuclear Station, North Carolina

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	3298	1.12	2685	66.91	613	71.24	-4.322***	(-3.85)
Black	3298	1.00	2685	24.65	613	20.39	4.263***	(4.27)
Asian	3298	0.17	2685	1.64	613	2.59	-0.952***	(-5.68)
Native American	3298	0.11	2685	0.95	613	0.38	0.567***	(5.28)
Others	3298	0.23	2685	4.51	613	4.92	-0.407	(-1.76)
Hispanic	3298	0.39	2685	6.01	613	8.06	-2.052***	(-5.20)
Color	3298	1.17	2685	34.57	613	32.61	1.964	(1.68)
White (2000)	3298	1.06	2685	69.79	613	76.12	-6.336***	(-6.00)
Black	3298	0.97	2685	24.87	613	18.32	6.549***	(6.72)
Asian	3298	0.10	2685	1.21	613	1.71	-0.498***	(-5.09)
Native American	3298	0.11	2685	1.03	613	0.47	0.554***	(5.08)
Others	3298	0.17	2685	2.98	613	3.21	-0.23	(-1.35)
Hispanic	3298	0.26	2685	3.56	613	4.46	-0.901***	(-3.52)
Color	3298	1.08	2685	31.53	613	25.80	5.733***	(5.28)
White (1990)	3298	1.04	2685	73.70	613	81.34	-7.632***	(-7.31)
Black	3298	1.01	2685	23.96	613	16.72	7.231***	(7.19)
Asian	3298	0.07	2685	0.67	613	0.80	-0.128	(-1.95)
Native American	3298	0.11	2685	0.96	613	0.36	0.599***	(5.21)
Others	3298	0.03	2685	0.36	613	0.27	0.0839**	(2.69)
Hispanic	3298	0.05	2685	0.95	613	0.80	0.151**	(2.98)
Color	3298	1.02	2685	26.46	613	18.66	7.796***	(7.67)

*p<0.05, **p<0.01, ***p<0.001

44. Shearon Harris Nuclear Power Plant, North Carolina

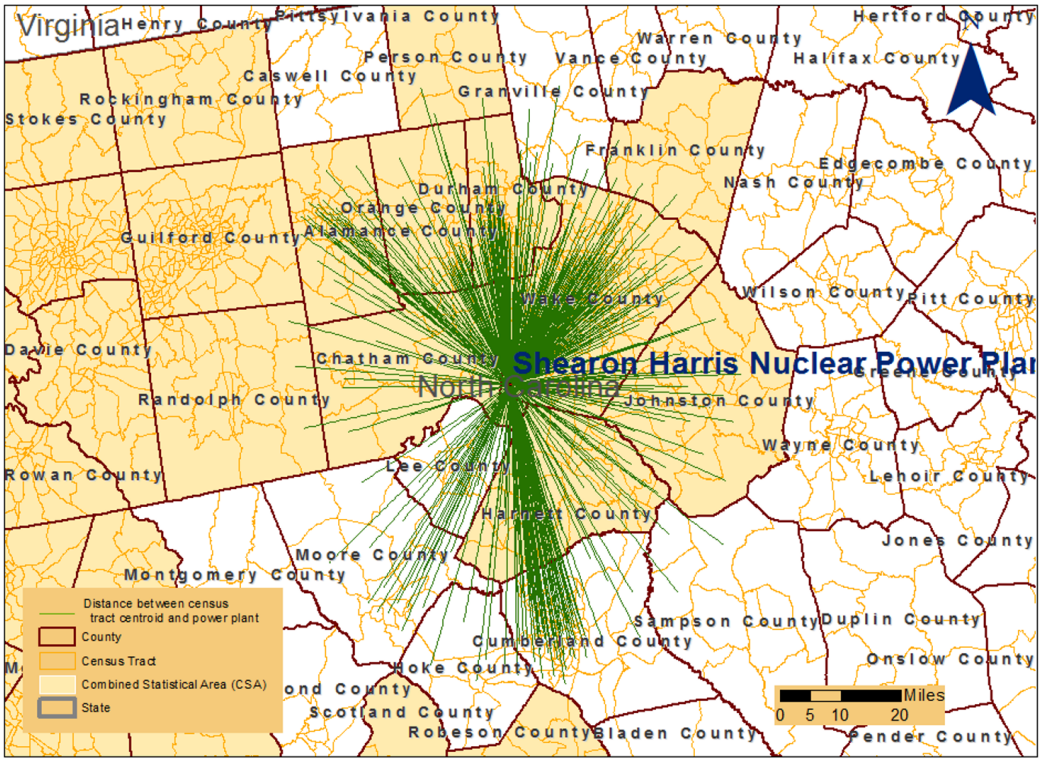

Figure B. 44 Distance to census-tract center points of census tracts within a 50-mile radius of Shearon Harris Nuclear Power Plant, North Carolina in 1990, 2000, and 2010

Table B. 87

Demographic Composition of Population, as sorted by Distance from Shearon Harris Nuclear Power Plant, North Carolina in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	19	111	176	102	78	486	1,709
Tract area (sq. mile)	272	954	1,727	1,866	1,399	6,217	47,602
Total population	24,724	249,080	499,206	346,954	273,388	1,393,352	5,235,264
White	18,076	195,649	357,131	244,455	188,777	1,004,088	4,007,155
Black	6,338	46,154	129,542	91,404	74,580	348,018	1,107,321
Asian	137	4,971	8,639	3,861	2,972	20,580	29,811
Native American	64	871	1,691	2,114	4,317	9,057	73,549
Others	116	1,394	2,228	5,122	2,743	11,603	17,442
Hispanic	344	3,538	5,872	9,573	5,928	25,255	43,763
Color	6,832	55,329	145,225	105,925	87,170	400,481	1,250,842
White (%)	73.11	78.55	71.54	70.46	69.05	72.06	76.54
Black (%)	25.64	18.53	25.95	26.34	27.28	24.98	21.15
Asian (%)	0.55	2.00	1.73	1.11	1.09	1.48	0.57
Native American (%)	0.26	0.35	0.34	0.61	1.58	0.65	1.40
Others (%)	0.47	0.56	0.45	1.48	1.00	0.83	0.33
Hispanic (%)	1.39	1.42	1.18	2.76	2.17	1.81	0.84
Color (%)	27.63	22.21	29.09	30.53	31.89	28.74	23.89
Female (%)	51.80	50.51	52.42	49.17	51.82	51.14	51.66
Old (65 + years) (%)	10.86	8.60	9.71	9.54	11.24	9.79	12.72
Kid (< 5 years) (%)	9.54	7.98	8.30	9.19	9.14	8.65	8.11
Native-born (%)	98.41	95.86	96.36	97.74	97.45	96.86	98.64
Renter housing units (%)	24.64	36.58	38.68	31.79	30.25	34.82	26.99
Education (%)	20.10	33.01	33.55	16.53	16.11	25.66	15.24
Unemployment (%)	3.26	3.74	3.94	5.42	5.82	4.55	4.86
Poverty (%)	9.70	11.29	11.18	11.46	13.11	11.63	13.32
Mean household income ($)	60,506	63,876	64,641	54,434	53,679	59,938	53,138
Year 2000							
Total population	54,745	364,328	656,183	421,566	333,000	1,829,822	6,219,491
White	43,286	274,941	426,252	285,718	210,313	1,240,510	4,561,655
Black	8,362	56,852	172,471	106,660	95,130	439,475	1,294,679
Asian	1,113	14,102	17,636	4,849	5,512	43,212	71,779
Native American	258	1,532	3,128	2,988	4,718	12,624	88,332
Others	1,742	16,830	36,745	21,364	17,311	93,992	203,055
Hispanic	2,056	21,836	46,593	25,944	20,476	116,905	256,059
Color	12,396	98,885	248,860	146,147	130,529	636,817	1,763,543
White (%)	79.07	75.47	64.96	67.78	63.16	67.79	73.34
Black (%)	15.27	15.60	26.28	25.30	28.57	24.02	20.82
Asian (%)	2.03	3.87	2.69	1.15	1.66	2.36	1.15
Native American (%)	0.47	0.42	0.48	0.71	1.42	0.69	1.42
Others (%)	3.18	4.62	5.60	5.07	5.20	5.14	3.26
Hispanic (%)	3.76	5.99	7.10	6.15	6.15	6.39	4.12
Color (%)	22.64	27.14	37.93	34.67	39.20	34.80	28.36
Female (%)	50.96	49.81	51.45	49.59	51.41	50.67	51.15
Old (65 + years) (%)	7.41	8.26	8.76	10.26	11.55	9.47	12.81
Kid (< 5 years) (%)	11.05	7.78	8.30	8.95	8.69	8.50	7.88
Native-born (%)	93.99	90.01	90.01	94.80	94.34	92.02	95.43
Renter housing units (%)	20.04	33.06	35.91	28.83	29.64	32.15	25.89
College degree or higher (%)	40.46	42.91	37.96	21.84	19.89	32.03	19.76
Unemployment (%)	2.30	5.04	4.31	5.61	5.95	4.94	5.44
Poverty (%)	5.35	9.65	11.58	11.15	12.00	10.99	12.66
Mean household income ($)	85,239	81,543	75,356	63,473	61,973	71,827	61,520
Year 2010							
Total population	84,598	469,143	806,279	487,213	374,805	2,222,038	7,049,140
White	64,958	336,291	493,610	324,251	221,779	1,440,889	5,012,838
Black	10,978	69,906	215,284	116,846	108,922	521,936	1,459,006
Asian	3,410	30,026	29,999	8,170	7,002	78,607	121,556
Native American	181	2,072	2,170	2,065	4,280	10,768	95,258
Others	5,071	30,848	65,216	35,881	32,822	169,838	360,482
Hispanic	4,979	42,502	91,906	45,294	35,270	219,951	503,457
Color	21,980	151,942	351,651	182,026	165,707	873,306	2,268,808
White (%)	76.78	71.68	61.22	66.55	59.17	64.85	71.11

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	12.98	14.90	26.70	23.98	29.06	23.49	20.70
Asian (%)	4.03	6.40	3.72	1.68	1.87	3.54	1.72
Native American (%)	0.21	0.44	0.27	0.42	1.14	0.48	1.35
Others (%)	5.99	6.58	8.09	7.36	8.76	7.64	5.11
Hispanic (%)	5.89	9.06	11.40	9.30	9.41	9.90	7.14
Color (%)	25.98	32.39	43.61	37.36	44.21	39.30	32.19
Female (%)	51.05	50.40	52.12	50.59	51.83	51.33	51.23
Old (65 + years) (%)	7.11	9.26	9.03	11.36	12.31	10.07	13.39
Kid (< 5 years) (%)	9.72	6.73	7.47	7.67	6.96	7.36	6.50
Native-born (%)	91.73	86.75	87.26	93.20	93.41	89.67	93.57
Renter housing units (%)	18.55	32.27	33.66	28.48	29.89	31.10	26.29
College degree or higher (%)	46.34	47.19	40.91	25.98	22.03	35.96	23.11
Unemployment (%)	5.54	6.29	7.21	8.99	9.45	7.64	9.11
Poverty (%)	5.57	10.90	14.03	13.54	16.20	13.30	16.23
Mean household income ($)	85,138	81,927	72,288	63,019	57,944	70,362	59,138
Index	44	44	44	44	44	44	44

Table B. 88

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Shearon Harris Nuclear Power Plant, North Carolina

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	2195	1.20	1709	69.90	486	64.68	5.221***	(4.35)
Black	2195	1.03	1709	20.97	486	22.96	-1.992	(-1.93)
Asian	2195	0.26	1709	1.72	486	3.59	-1.873***	(-7.34)
Native American	2195	0.16	1709	1.30	486	0.48	0.821***	(5.02)
Others	2195	0.33	1709	4.89	486	7.48	-2.583***	(-7.93)
Hispanic	2195	0.44	1709	6.85	486	9.30	-2.448***	(-5.59)
Color	2195	1.21	1709	32.04	486	38.28	-6.234***	(-5.14)
White (2000)	2195	1.14	1709	73.74	486	68.79	4.955***	(4.36)
Black	2195	1.06	1709	20.30	486	23.15	-2.850**	(-2.68)
Asian	2195	0.14	1709	1.18	486	2.52	-1.339***	(-9.63)
Native American	2195	0.17	1709	1.35	486	0.66	0.688***	(4.12)
Others	2195	0.20	1709	3.14	486	4.90	-1.753***	(-8.80)
Hispanic	2195	0.28	1709	3.96	486	6.09	-2.134***	(-7.66)
Color	2195	1.16	1709	27.63	486	33.73	-6.107***	(-5.25)
White (1990)	2195	1.15	1709	78.16	486	74.09	4.074***	(3.56)
Black	2195	1.11	1709	19.23	486	23.03	-3.795***	(-3.41)
Asian	2195	0.09	1709	0.57	486	1.37	-0.795***	(-8.94)
Native American	2195	0.18	1709	1.32	486	0.56	0.765***	(4.21)
Others	2195	0.06	1709	0.29	486	0.72	-0.422***	(-6.82)
Hispanic	2195	0.10	1709	0.79	486	1.63	-0.845***	(-8.76)
Color	2195	1.13	1709	21.86	486	26.48	-4.619***	(-4.09)

*p<0.05, **p<0.01, ***p<0.001

45. Davis-Besse Nuclear Power Station, Ohio

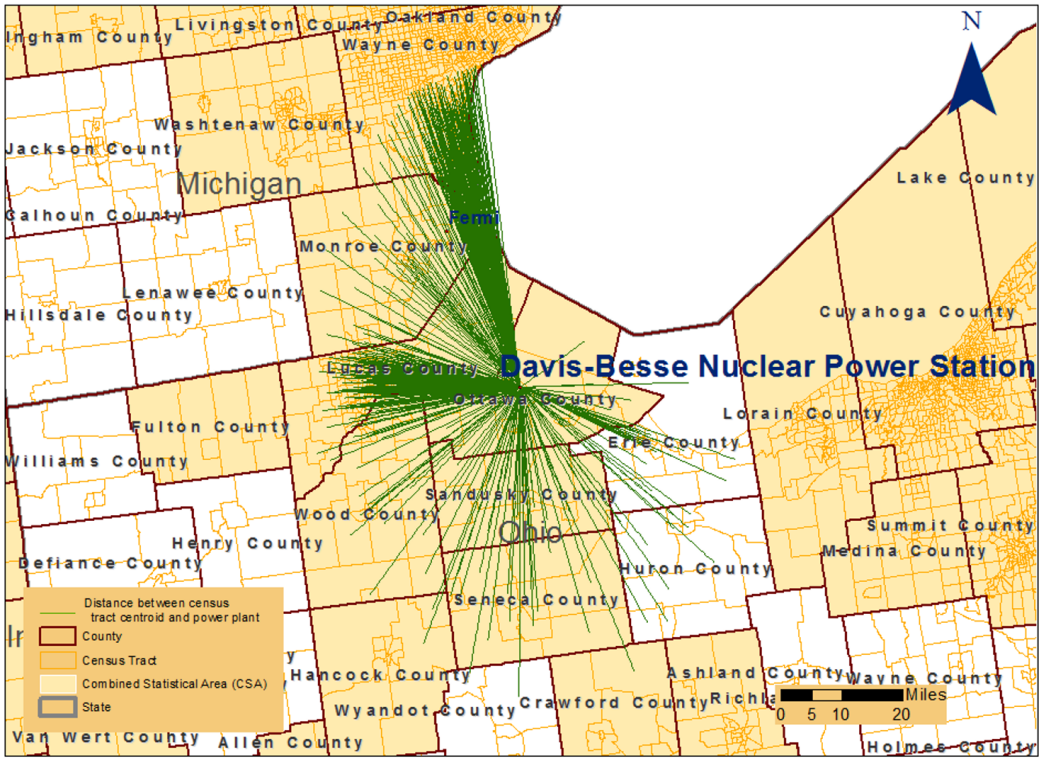

Figure B. 45 Distance to census-tract center points of census tracts within a 50-mile radius of Davis-Besse Nuclear Power Station, Ohio in 1990, 2000, and 2010

Table B. 89
Demographic Composition of Population, as sorted by Distance from Davis-Besse Nuclear Power Station, Ohio in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	6	27	163	65	102	363	5,402
Tract area (sq. mile)	416	758	1,397	1,146	758	4,476	137,063
Total population	22,999	94,762	586,871	264,486	374,460	1,343,578	18,798,744
White	22,333	90,228	498,548	254,720	339,036	1,204,865	16,079,312
Black	167	2,171	73,677	4,422	27,526	107,963	2,333,273
Asian	64	249	4,603	2,568	3,137	10,621	181,491
Native American	64	132	1,558	711	2,161	4,626	76,625
Others	375	1,974	8,491	2,064	2,600	15,504	128,028
Hispanic	940	4,149	16,610	4,880	9,851	36,430	285,469
Color	1,235	6,727	96,344	12,447	42,568	159,321	2,870,556
White (%)	97.10	95.22	84.95	96.31	90.54	89.68	85.53
Black (%)	0.73	2.29	12.55	1.67	7.35	8.04	12.41
Asian (%)	0.28	0.26	0.78	0.97	0.84	0.79	0.97
Native American (%)	0.28	0.14	0.27	0.27	0.58	0.34	0.41
Others (%)	1.63	2.08	1.45	0.78	0.69	1.15	0.68
Hispanic (%)	4.09	4.38	2.83	1.85	2.63	2.71	1.52
Color (%)	5.37	7.10	16.42	4.71	11.37	11.86	15.27
Female (%)	50.32	51.45	51.98	51.56	51.52	51.70	51.65
Old (65 + years) (%)	13.82	13.77	13.03	10.48	12.07	12.33	12.49
Kid (< 5 years) (%)	7.67	8.37	9.29	8.40	8.77	8.88	8.87
Native-born (%)	98.87	98.43	97.71	97.85	96.32	97.42	96.91
Renter housing units (%)	17.36	20.40	31.01	26.13	25.38	27.49	28.29
Education (%)	10.54	11.30	15.38	17.42	9.97	13.84	17.38
Unemployment (%)	8.49	6.99	8.25	6.24	8.09	7.71	7.34
Poverty (%)	7.21	8.36	14.14	9.06	9.90	11.45	12.90
Mean household income ($)	58,521	58,550	57,630	66,489	61,610	60,453	60,011
Year 2000							
Total population	23,501	96,100	582,186	284,237	367,992	1,354,016	19,937,568
White	22,792	89,248	470,175	267,834	318,925	1,168,974	16,431,891
Black	69	2,497	82,714	5,523	32,483	123,286	2,566,796
Asian	51	435	5,192	3,268	3,747	12,693	299,572
Native American	80	246	1,687	511	1,827	4,351	83,490
Others	515	3,668	22,421	7,097	11,003	44,704	555,827
Hispanic	951	5,318	23,783	7,336	13,614	51,002	485,047
Color	1,263	9,300	122,576	20,013	57,217	210,369	3,738,808
White (%)	96.98	92.87	80.76	94.23	86.67	86.33	82.42
Black (%)	0.29	2.60	14.21	1.94	8.83	9.11	12.87
Asian (%)	0.22	0.45	0.89	1.15	1.02	0.94	1.50
Native American (%)	0.34	0.26	0.29	0.18	0.50	0.32	0.42
Others (%)	2.19	3.82	3.85	2.50	2.99	3.30	2.79
Hispanic (%)	4.05	5.53	4.09	2.58	3.70	3.77	2.43
Color (%)	5.37	9.68	21.05	7.04	15.55	15.54	18.75
Female (%)	50.77	51.37	51.65	51.07	51.49	51.45	51.22
Old (65 + years) (%)	14.64	15.20	13.44	11.29	13.35	13.11	12.79
Kid (< 5 years) (%)	6.74	7.27	8.21	7.53	8.15	7.96	8.09
Native-born (%)	98.96	98.36	97.39	97.21	96.40	97.18	95.86
Renter housing units (%)	14.76	19.92	30.25	24.63	22.79	26.03	26.25
College degree or higher (%)	13.58	13.90	18.64	21.94	12.33	17.12	21.69
Unemployment (%)	3.99	4.75	5.71	5.15	5.68	5.48	5.34
Poverty (%)	6.70	7.30	12.73	8.01	8.50	10.10	10.60
Mean household income ($)	65,801	63,897	62,473	73,446	68,645	66,499	68,575
Year 2010							
Total population	23,312	96,554	562,982	303,934	362,811	1,349,593	20,115,524
White	22,134	89,114	444,314	280,843	300,132	1,136,537	16,357,529
Black	262	2,837	88,499	8,709	40,783	141,090	2,651,766
Asian	127	403	6,293	4,604	5,395	16,822	417,412
Native American	65	200	1,910	666	1,462	4,303	72,984
Others	724	4,000	21,966	9,112	15,039	50,841	615,834
Hispanic	1,146	6,689	28,863	12,381	21,487	70,566	685,865
Color	1,825	11,077	134,953	30,332	74,527	252,714	4,159,412
White (%)	94.95	92.29	78.92	92.40	82.72	84.21	81.32

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	1.12	2.94	15.72	2.87	11.24	10.45	13.18
Asian (%)	0.54	0.42	1.12	1.51	1.49	1.25	2.08
Native American (%)	0.28	0.21	0.34	0.22	0.40	0.32	0.36
Others (%)	3.11	4.14	3.90	3.00	4.15	3.77	3.06
Hispanic (%)	4.92	6.93	5.13	4.07	5.92	5.23	3.41
Color (%)	7.83	11.47	23.97	9.98	20.54	18.73	20.68
Female (%)	51.08	50.85	51.59	50.72	51.38	51.28	51.07
Old (65 + years) (%)	16.22	16.28	13.28	12.82	13.19	13.42	13.52
Kid (< 5 years) (%)	5.10	5.95	6.54	5.80	6.15	6.20	6.24
Native-born (%)	98.79	97.71	97.09	96.65	95.63	96.67	95.09
Renter housing units (%)	12.77	18.34	29.35	23.14	22.55	25.08	24.84
College degree or higher (%)	15.75	15.67	20.68	24.81	15.14	19.60	24.88
Unemployment (%)	8.32	7.89	11.49	9.49	12.38	10.94	9.89
Poverty (%)	9.87	10.16	16.78	10.60	13.40	13.90	14.52
Mean household income ($)	59,922	60,610	56,287	69,453	58,802	60,178	63,067
Index	45	45	45	45	45	45	45

Table B. 90

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Davis-Besse Nuclear Power Station, Ohio

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	5765	1.40	5402	76.65	363	80.36	-3.717**	(-2.66)
Black	5765	1.28	5402	16.69	363	13.05	3.649**	(2.85)
Asian	5765	0.12	5402	1.93	363	1.09	0.836***	(6.73)
Native American	5765	0.04	5402	0.37	363	0.33	0.0379	(0.97)
Others	5765	0.20	5402	3.12	363	3.79	-0.669***	(-3.41)
Hispanic	5765	0.30	5402	3.48	363	5.44	-1.957***	(-6.49)
Color	5765	1.31	5402	24.13	363	21.32	2.812*	(2.15)
White (2000)	5765	1.37	5402	79.51	363	82.73	-3.212*	(-2.34)
Black	5765	1.25	5402	14.83	363	11.34	3.485**	(2.79)
Asian	5765	0.09	5402	1.50	363	0.89	0.608***	(6.84)
Native American	5765	0.04	5402	0.48	363	0.34	0.140***	(3.50)
Others	5765	0.16	5402	2.91	363	3.35	-0.444**	(-2.79)
Hispanic	5765	0.21	5402	2.50	363	3.79	-1.293***	(-6.16)
Color	5765	1.28	5402	20.73	363	17.75	2.973*	(2.33)
White (1990)	5765	1.32	5402	84.34	363	86.94	-2.604*	(-1.97)
Black	5765	1.20	5402	12.77	363	9.43	3.344**	(2.78)
Asian	5765	0.07	5402	0.96	363	0.75	0.218**	(3.11)
Native American	5765	0.03	5402	0.44	363	0.36	0.0821**	(2.71)
Others	5765	0.11	5402	0.72	363	1.15	-0.433***	(-3.98)
Hispanic	5765	0.17	5402	1.56	363	2.71	-1.152***	(-6.90)
Color	5765	1.20	5402	15.60	363	13.20	2.402*	(2.01)

*p<0.05, **p<0.01, ***p<0.001

46. Perry Nuclear Power Plant, Ohio

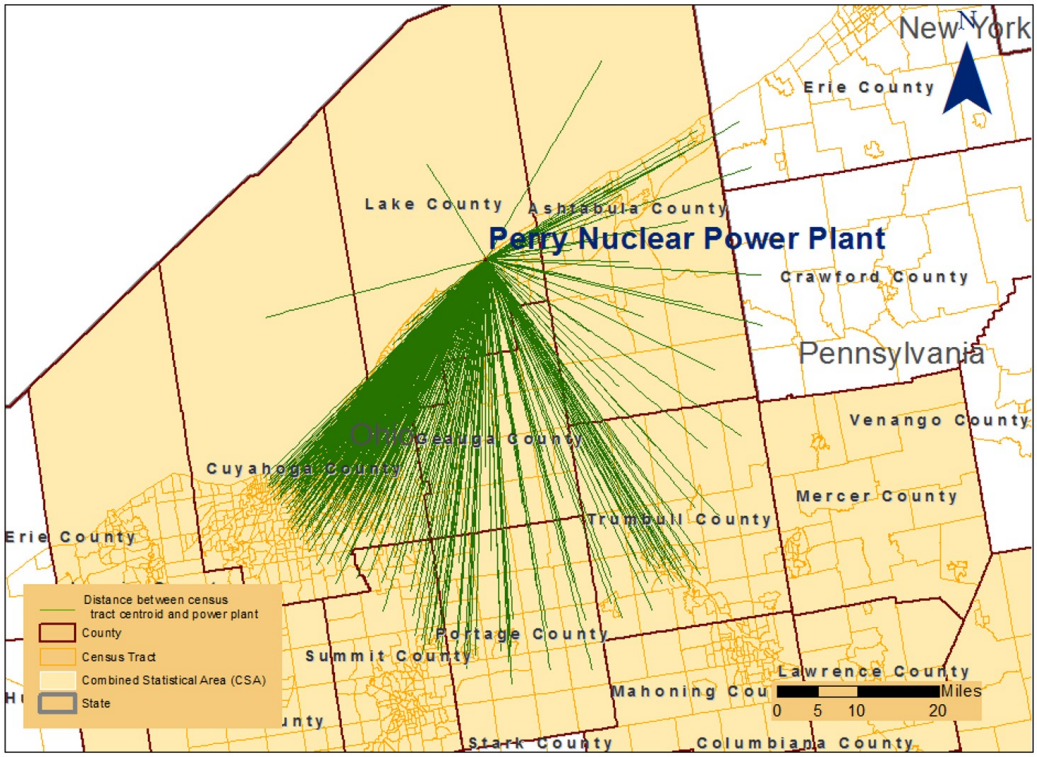

Figure B. 46 Distance to census-tract center points of census tracts within a 50-mile radius of Perry Nuclear Power Plant, Ohio in 1990, 2000, and 2010

Table B. 91

Demographic Composition of Population, as sorted by Distance from Perry Nuclear Power Plant, Ohio in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	22	51	120	254	84	531	5,639
Tract area (sq. mile)	141	1,212	2,142	931	479	4,905	85,975
Total population	68,920	199,578	407,025	761,604	328,910	1,766,037	20,962,608
White	66,129	194,305	304,537	487,990	307,495	1,360,456	18,687,648
Black	2,212	3,015	96,726	250,079	16,988	369,020	1,870,760
Asian	143	1,339	4,312	8,066	3,183	17,043	207,277
Native American	198	356	544	1,762	556	3,416	34,879
Others	242	563	910	13,696	693	16,104	162,001
Hispanic	962	1,724	2,813	23,082	2,374	30,955	321,504
Color	3,471	6,511	104,206	282,413	23,219	419,820	2,425,832
White (%)	95.95	97.36	74.82	64.07	93.49	77.03	89.15
Black (%)	3.21	1.51	23.76	32.84	5.16	20.90	8.92
Asian (%)	0.21	0.67	1.06	1.06	0.97	0.97	0.99
Native American (%)	0.29	0.18	0.13	0.23	0.17	0.19	0.17
Others (%)	0.35	0.28	0.22	1.80	0.21	0.91	0.77
Hispanic (%)	1.40	0.86	0.69	3.03	0.72	1.75	1.53
Color (%)	5.04	3.26	25.60	37.08	7.06	23.77	11.57
Female (%)	50.92	51.52	53.46	52.74	52.01	52.56	51.91
Old (65 + years) (%)	11.25	12.35	16.91	14.04	13.22	14.25	14.24
Kid (< 5 years) (%)	9.48	8.54	8.13	9.16	7.96	8.64	8.32
Native-born (%)	98.02	97.35	94.02	95.72	95.95	95.64	97.37
Renter housing units (%)	25.14	23.46	32.05	38.98	25.85	32.90	28.07
Education (%)	13.03	17.24	23.04	15.23	20.23	18.16	17.43
Unemployment (%)	5.80	5.42	6.67	9.75	5.95	7.61	6.16
Poverty (%)	8.58	7.18	10.74	19.59	9.48	13.84	11.63
Mean household income ($)	58,729	65,223	67,983	51,882	64,978	59,780	59,105
Year 2000							
Total population	75,998	209,426	400,393	759,545	343,210	1,788,572	21,845,622
White	70,583	201,024	275,267	450,578	313,076	1,310,528	18,816,172
Black	2,332	3,524	112,698	262,807	19,756	401,117	2,098,911
Asian	384	1,570	5,609	12,817	4,551	24,931	330,193
Native American	123	241	420	1,754	546	3,084	43,426
Others	2,583	3,068	6,397	31,578	5,287	48,913	556,919
Hispanic	3,116	2,979	3,923	35,423	3,735	49,176	556,834
Color	6,970	10,121	127,497	322,959	32,580	500,127	3,268,987
White (%)	92.87	95.99	68.75	59.32	91.22	73.27	86.13
Black (%)	3.07	1.68	28.15	34.60	5.76	22.43	9.61
Asian (%)	0.51	0.75	1.40	1.69	1.33	1.39	1.51
Native American (%)	0.16	0.12	0.10	0.23	0.16	0.17	0.20
Others (%)	3.40	1.46	1.60	4.16	1.54	2.73	2.55
Hispanic (%)	4.10	1.42	0.98	4.66	1.09	2.75	2.55
Color (%)	9.17	4.83	31.84	42.52	9.49	27.96	14.96
Female (%)	50.59	51.70	53.17	52.34	51.69	52.25	51.55
Old (65 + years) (%)	11.44	14.11	16.89	13.61	14.40	14.47	14.51
Kid (< 5 years) (%)	8.50	7.29	7.65	8.50	7.39	7.96	7.55
Native-born (%)	96.27	96.88	93.58	95.23	95.84	95.22	96.51
Renter housing units (%)	22.40	21.86	30.32	37.04	24.71	30.94	27.05
College degree or higher (%)	16.04	21.34	27.70	20.31	24.95	22.84	21.67
Unemployment (%)	4.30	3.65	5.34	7.63	4.67	5.87	5.28
Poverty (%)	7.50	6.13	10.94	17.57	8.22	12.52	10.65
Mean household income ($)	65,424	71,288	72,616	59,867	72,744	66,774	65,640
Year 2010							
Total population	80,167	207,252	374,819	695,322	341,899	1,699,459	22,425,676
White	73,646	196,845	241,739	399,049	305,993	1,217,272	18,841,550
Black	3,453	3,854	119,345	254,470	22,446	403,568	2,334,724
Asian	631	2,218	6,877	15,941	5,675	31,342	492,731
Native American	101	439	462	1,695	524	3,221	37,769
Others	2,336	3,896	6,396	24,167	7,261	44,056	718,903
Hispanic	4,966	4,812	5,677	40,579	5,247	61,281	928,246
Color	10,256	13,741	136,703	320,734	39,218	520,652	4,082,172
White (%)	91.87	94.98	64.49	57.39	89.50	71.63	84.02

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	4.31	1.86	31.84	36.60	6.57	23.75	10.41
Asian (%)	0.79	1.07	1.83	2.29	1.66	1.84	2.20
Native American (%)	0.13	0.21	0.12	0.24	0.15	0.19	0.17
Others (%)	2.91	1.88	1.71	3.48	2.12	2.59	3.21
Hispanic (%)	6.19	2.32	1.51	5.84	1.53	3.61	4.14
Color (%)	12.79	6.63	36.47	46.13	11.47	30.64	18.20
Female (%)	49.73	51.71	52.78	52.46	51.21	52.06	51.21
Old (65 + years) (%)	12.00	16.05	16.81	13.87	14.73	14.87	14.53
Kid (< 5 years) (%)	6.51	5.76	5.70	6.12	5.66	5.91	6.03
Native-born (%)	95.22	96.24	93.96	94.73	95.17	94.86	95.28
Renter housing units (%)	22.95	21.81	29.08	34.67	25.11	29.63	26.39
College degree or higher (%)	19.23	24.07	29.83	23.26	28.97	25.78	25.29
Unemployment (%)	7.49	6.53	9.03	12.54	8.00	9.82	7.80
Poverty (%)	12.12	9.53	13.72	20.89	12.63	15.85	13.03
Mean household income ($)	62,082	66,964	66,200	55,466	66,754	61,796	65,084
Index	46	46	46	46	46	46	46

Table B. 92

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Perry Nuclear Power Plant, Ohio

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	6170	1.60	5639	81.98	531	63.19	18.80***	(11.76)
Black	6170	1.60	5639	12.14	531	31.28	-19.14***	(-11.99)
Asian	6170	0.16	5639	2.04	531	1.69	0.346*	(2.21)
Native American	6170	0.03	5639	0.17	531	0.22	-0.0425	(-1.67)
Others	6170	0.18	5639	3.24	531	2.87	0.366*	(1.99)
Hispanic	6170	0.37	5639	4.10	531	4.08	0.0251	(0.07)
Color	6170	1.58	5639	19.79	531	38.54	-18.75***	(-11.85)
White (2000)	6170	1.59	5639	84.68	531	67.13	17.54***	(11.00)
Black	6170	1.59	5639	10.90	531	27.65	-16.75***	(-10.52)
Asian	6170	0.12	5639	1.49	531	1.43	0.0575	(0.47)
Native American	6170	0.02	5639	0.21	531	0.19	0.0235	(1.38)
Others	6170	0.21	5639	2.63	531	3.04	-0.415	(-1.95)
Hispanic	6170	0.31	5639	2.58	531	3.11	-0.522	(-1.69)
Color	6170	1.58	5639	16.31	531	33.62	-17.31***	(-10.94)
White (1990)	6170	1.59	5639	88.82	531	73.55	15.27***	(9.61)
Black	6170	1.59	5639	9.18	531	23.78	-14.60***	(-9.19)
Asian	6170	0.08	5639	0.99	531	1.00	-0.0114	(-0.14)
Native American	6170	0.02	5639	0.17	531	0.21	-0.0374*	(-2.29)
Others	6170	0.15	5639	0.75	531	1.09	-0.339*	(-2.24)
Hispanic	6170	0.23	5639	1.52	531	2.02	-0.500*	(-2.21)
Color	6170	1.57	5639	11.80	531	26.95	-15.15***	(-9.65)

*p<0.05, **p<0.01, ***p<0.001

47. Beaver Valley Power Station, Pennsylvania

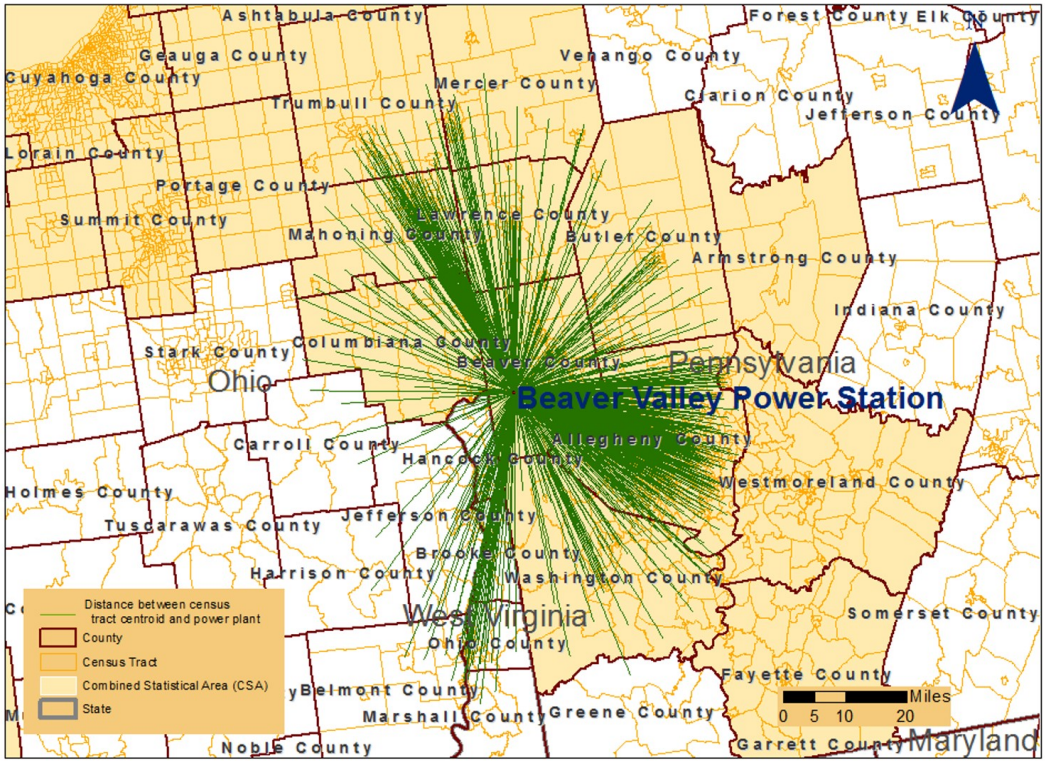

Figure B. 47 Distance to census-tract center points of census tracts within a 50-mile radius of Beaver Valley Power Station, Pennsylvania in 1990, 2000, and 2010

Table B. 93

Demographic Composition of Population, as sorted by Distance from Beaver Valley Power Station, Pennsylvania in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	33	97	313	269	96	808	5,846
Tract area (sq. mile)	279	963	1,639	1,747	1,019	5,647	109,463
Total population	119,111	341,379	1,060,141	954,382	349,524	2,824,537	21,697,584
White	111,021	330,728	935,988	853,255	328,368	2,559,360	19,214,768
Black	7,439	8,428	110,586	92,163	18,478	237,094	2,058,081
Asian	226	1,523	10,299	3,687	1,492	17,227	214,602
Native American	203	383	1,490	1,171	484	3,731	37,662
Others	234	279	1,782	4,133	696	7,124	172,432
Hispanic	604	1,485	6,729	8,240	1,658	18,716	341,636
Color	8,506	11,898	128,961	105,646	22,322	277,333	2,641,997
White (%)	93.21	96.88	88.29	89.40	93.95	90.61	88.56
Black (%)	6.25	2.47	10.43	9.66	5.29	8.39	9.49
Asian (%)	0.19	0.45	0.97	0.39	0.43	0.61	0.99
Native American (%)	0.17	0.11	0.14	0.12	0.14	0.13	0.17
Others (%)	0.20	0.08	0.17	0.43	0.20	0.25	0.79
Hispanic (%)	0.51	0.44	0.63	0.86	0.47	0.66	1.57
Color (%)	7.14	3.49	12.16	11.07	6.39	9.82	12.18
Female (%)	52.76	51.82	52.86	52.94	52.38	52.70	51.86
Old (65 + years) (%)	16.96	15.06	17.16	17.59	17.65	17.10	13.93
Kid (< 5 years) (%)	7.82	7.76	7.45	7.54	7.45	7.53	8.36
Native-born (%)	97.90	97.95	96.89	97.84	98.08	97.53	97.35
Renter housing units (%)	26.42	22.30	31.20	27.65	25.13	28.01	28.02
Education (%)	10.95	18.01	21.14	15.52	13.11	17.44	17.07
Unemployment (%)	8.83	6.38	6.50	7.56	7.79	7.08	6.40
Poverty (%)	16.37	9.55	12.72	13.08	13.58	12.72	12.33
Mean household income ($)	48,114	60,829	59,438	51,531	50,431	55,351	58,440
Year 2000							
Total population	115,882	360,292	1,022,100	923,557	336,094	2,757,925	22,684,612
White	106,422	342,247	881,207	797,390	309,290	2,436,556	19,407,626
Black	7,671	9,982	108,182	102,859	19,560	248,254	2,307,773
Asian	292	3,036	16,336	5,864	1,996	27,524	337,450
Native American	139	450	1,294	1,517	541	3,941	46,339
Others	1,369	4,529	15,105	15,928	4,703	41,634	585,441
Hispanic	1,014	3,300	9,403	11,710	2,758	28,185	589,599
Color	10,179	20,125	146,362	132,175	28,564	337,405	3,530,736
White (%)	91.84	94.99	86.22	86.34	92.02	88.35	85.55
Black (%)	6.62	2.77	10.58	11.14	5.82	9.00	10.17
Asian (%)	0.25	0.84	1.60	0.63	0.59	1.00	1.49
Native American (%)	0.12	0.12	0.13	0.16	0.16	0.14	0.20
Others (%)	1.18	1.26	1.48	1.72	1.40	1.51	2.58
Hispanic (%)	0.88	0.92	0.92	1.27	0.82	1.02	2.60
Color (%)	8.78	5.59	14.32	14.31	8.50	12.23	15.56
Female (%)	52.39	51.30	52.36	52.65	52.17	52.30	51.50
Old (65 + years) (%)	18.20	15.79	17.38	18.49	18.24	17.68	14.18
Kid (< 5 years) (%)	7.09	7.22	6.69	6.95	6.64	6.86	7.61
Native-born (%)	98.46	97.54	96.36	97.95	98.12	97.35	96.50
Renter housing units (%)	25.65	20.54	30.00	26.31	24.40	26.73	26.93
College degree or higher (%)	14.47	24.76	26.89	18.94	16.78	22.18	21.13
Unemployment (%)	5.41	4.40	6.34	5.87	6.26	5.88	5.40
Poverty (%)	11.31	7.56	11.79	11.86	12.51	11.32	11.30
Mean household income ($)	53,823	71,293	64,496	56,723	56,077	61,272	64,972
Year 2010							
Total population	108,656	363,062	988,565	876,230	319,082	2,655,595	23,310,344
White	98,914	338,398	842,323	740,456	291,560	2,311,651	19,481,786
Black	7,166	11,120	100,457	107,701	19,285	245,729	2,551,531
Asian	374	6,372	24,466	8,219	2,050	41,481	494,603
Native American	110	389	1,092	1,142	446	3,179	40,950
Others	2,092	6,783	20,227	18,712	5,741	53,555	741,473
Hispanic	1,322	4,767	14,187	16,600	4,313	41,189	969,293
Color	10,672	27,561	155,220	146,119	30,482	370,054	4,353,806
White (%)	91.03	93.21	85.21	84.50	91.37	87.05	83.58

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	6.60	3.06	10.16	12.29	6.04	9.25	10.95
Asian (%)	0.34	1.76	2.47	0.94	0.64	1.56	2.12
Native American (%)	0.10	0.11	0.11	0.13	0.14	0.12	0.18
Others (%)	1.93	1.87	2.05	2.14	1.80	2.02	3.18
Hispanic (%)	1.22	1.31	1.44	1.89	1.35	1.55	4.16
Color (%)	9.82	7.59	15.70	16.68	9.55	13.93	18.68
Female (%)	51.95	50.85	51.96	52.11	52.03	51.87	51.17
Old (65 + years) (%)	18.33	15.89	16.87	17.70	18.10	17.22	14.35
Kid (< 5 years) (%)	5.47	5.55	5.10	5.33	5.19	5.26	6.07
Native-born (%)	97.95	96.96	95.54	97.75	98.40	96.90	95.34
Renter housing units (%)	24.30	20.17	28.59	25.88	24.29	25.92	26.27
College degree or higher (%)	18.03	30.45	32.11	22.56	19.19	26.58	24.51
Unemployment (%)	7.23	6.26	7.04	8.15	8.18	7.43	7.94
Poverty (%)	12.58	9.41	12.81	13.74	15.43	12.96	13.59
Mean household income ($)	56,082	75,637	65,853	55,540	52,271	61,673	64,111
Index	47	47	47	47	47	47	47

Table B. 94 *Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Beaver Valley Power Station, Pennsylvania*

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	6654	0.91	5846	81.16	808	82.72	-1.561	(-1.71)
Black	6654	0.82	5846	13.11	808	12.58	0.537	(0.65)
Asian	6654	0.13	5846	1.98	808	1.43	0.549***	(4.33)
Native American	6654	0.02	5846	0.18	808	0.13	0.0552***	(3.43)
Others	6654	0.12	5846	3.21	808	2.29	0.927***	(7.85)
Hispanic	6654	0.15	5846	4.19	808	1.67	2.522***	(16.89)
Color	6654	0.89	5846	20.75	808	17.40	3.351***	(3.78)
White (2000)	6654	0.87	5846	83.78	808	85.43	-1.647	(-1.89)
Black	6654	0.83	5846	11.70	808	11.73	-0.0331	(-0.04)
Asian	6654	0.08	5846	1.47	808	1.00	0.468***	(5.57)
Native American	6654	0.01	5846	0.22	808	0.15	0.0625***	(4.77)
Others	6654	0.09	5846	2.68	808	1.69	0.987***	(10.39)
Hispanic	6654	0.11	5846	2.68	808	1.08	1.604***	(15.21)
Color	6654	0.87	5846	17.19	808	15.16	2.028*	(2.32)
White (1990)	6654	0.81	5846	88.00	808	88.99	-0.988	(-1.23)
Black	6654	0.79	5846	9.91	808	9.99	-0.0777	(-0.10)
Asian	6654	0.05	5846	0.99	808	0.62	0.373***	(6.78)
Native American	6654	0.01	5846	0.18	808	0.15	0.0302*	(2.15)
Others	6654	0.06	5846	0.79	808	0.28	0.514***	(9.31)
Hispanic	6654	0.08	5846	1.59	808	0.69	0.900***	(11.55)
Color	6654	0.81	5846	12.61	808	11.44	1.174	(1.46)

*p<0.05, **p<0.01, ***p<0.001

48. Limerick Generating Station, Pennsylvania

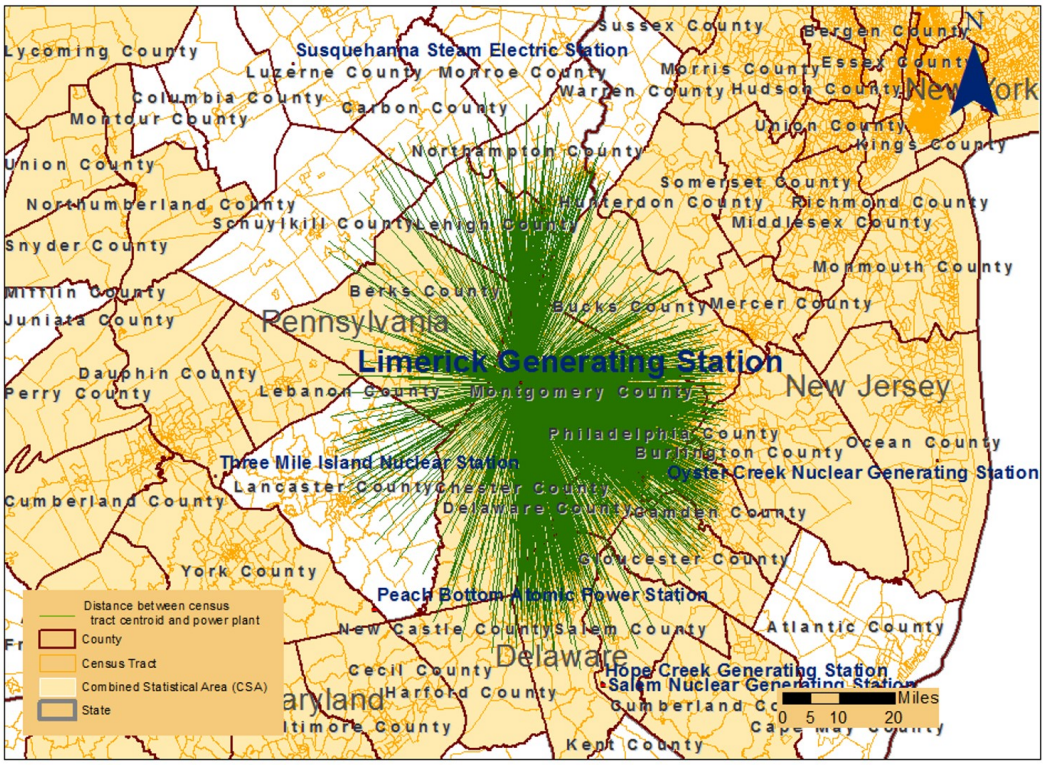

Figure B. 48 Distance to census-tract center points of census tracts within a 50-mile radius of Limerick Generating Station, Pennsylvania in 1990, 2000, and 2010

Table B. 95

Demographic Composition of Population, as sorted by Distance from Limerick Generating Station, Pennsylvania in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	62	231	704	499	113	1,609	3,837
Tract area (sq. mile)	350	913	1,512	2,035	950	5,759	51,506
Total population	184,712	790,709	2,732,462	1,859,942	418,565	5,986,390	14,291,528
White	174,314	727,752	1,895,372	1,602,011	383,381	4,782,830	12,411,323
Black	8,109	37,191	703,293	186,321	25,974	960,888	1,274,186
Asian	1,247	14,697	60,158	28,854	6,822	111,778	301,876
Native American	267	1,068	4,374	2,951	686	9,346	23,466
Others	767	9,993	69,256	39,790	1,715	121,521	280,645
Hispanic	2,376	22,040	107,438	68,080	5,389	205,323	750,634
Color	11,691	73,896	869,378	282,711	38,662	1,276,338	2,306,925
White (%)	94.37	92.04	69.36	86.13	91.59	79.90	86.84
Black (%)	4.39	4.70	25.74	10.02	6.21	16.05	8.92
Asian (%)	0.68	1.86	2.20	1.55	1.63	1.87	2.11
Native American (%)	0.14	0.14	0.16	0.16	0.16	0.16	0.16
Others (%)	0.42	1.26	2.53	2.14	0.41	2.03	1.96
Hispanic (%)	1.29	2.79	3.93	3.66	1.29	3.43	5.25
Color (%)	6.33	9.35	31.82	15.20	9.24	21.32	16.14
Female (%)	50.10	51.79	52.94	51.55	51.52	52.17	51.80
Old (65 + years) (%)	12.26	13.21	15.09	13.65	11.33	14.04	14.69
Kid (< 5 years) (%)	8.62	8.40	8.51	8.51	8.64	8.51	7.91
Native-born (%)	97.67	95.62	94.37	95.87	96.79	95.27	92.48
Renter housing units (%)	23.84	27.19	30.51	26.78	26.80	28.50	28.63
Education (%)	20.18	30.16	21.30	19.54	19.06	21.75	20.27
Unemployment (%)	3.47	3.51	6.79	4.79	4.36	5.41	5.98
Poverty (%)	3.98	5.11	13.81	8.09	7.20	10.13	9.50
Mean household income ($)	74,664	86,960	65,923	70,297	68,310	70,490	68,899
Year 2000							
Total population	222,564	876,175	2,774,273	1,930,389	479,320	6,282,721	15,196,283
White	204,582	762,985	1,778,519	1,577,481	408,245	4,731,812	12,438,488
Black	10,623	47,060	751,754	208,857	47,267	1,065,561	1,422,197
Asian	3,314	28,755	94,131	52,555	11,318	190,073	531,170
Native American	286	1,514	6,131	3,770	935	12,636	27,973
Others	3,751	35,877	143,727	87,723	11,580	282,658	776,436
Hispanic	3,593	45,929	172,828	115,833	13,017	351,200	1,194,391
Color	19,782	131,299	1,053,980	399,603	77,541	1,682,205	3,345,967
White (%)	91.92	87.08	64.11	81.72	85.17	75.31	81.85
Black (%)	4.77	5.37	27.10	10.82	9.86	16.96	9.36
Asian (%)	1.49	3.28	3.39	2.72	2.36	3.03	3.50
Native American (%)	0.13	0.17	0.22	0.20	0.20	0.20	0.18
Others (%)	1.69	4.09	5.18	4.54	2.42	4.50	5.11
Hispanic (%)	1.61	5.24	6.23	6.00	2.72	5.59	7.86
Color (%)	8.89	14.99	37.99	20.70	16.18	26.78	22.02
Female (%)	50.23	51.45	52.84	51.44	51.62	52.03	51.49
Old (65 + years) (%)	11.72	13.53	14.67	14.27	11.71	14.06	14.82
Kid (< 5 years) (%)	8.64	7.82	7.77	7.53	7.64	7.72	7.48
Native-born (%)	96.63	93.55	92.49	93.73	95.38	93.38	89.38
Renter housing units (%)	22.29	26.23	31.26	26.69	25.74	28.47	28.03
College degree or higher (%)	28.85	36.19	25.84	23.93	23.27	26.62	24.85
Unemployment (%)	4.39	3.94	7.50	4.94	5.64	5.91	5.61
Poverty (%)	4.37	6.49	14.88	8.90	7.34	10.92	9.53
Mean household income ($)	87,022	94,814	69,524	75,574	73,711	75,826	75,547
Year 2010							
Total population	257,462	938,523	2,844,249	2,009,040	509,935	6,559,209	15,656,351
White	229,340	787,408	1,736,334	1,581,055	403,574	4,737,711	12,422,821
Black	14,839	53,033	797,752	236,469	67,295	1,169,388	1,539,158
Asian	7,365	48,477	132,483	78,191	19,640	286,156	777,753
Native American	197	963	5,002	4,497	853	11,512	29,452
Others	5,721	48,642	172,678	108,828	18,573	354,442	887,167
Hispanic	6,414	79,425	258,163	179,807	27,973	551,782	1,639,817
Color	32,397	192,254	1,216,711	519,083	121,554	2,081,999	4,140,991
White (%)	89.08	83.90	61.05	78.70	79.14	72.23	79.35

Black (%)	5.76	5.65	28.05	11.77	13.20	17.83	9.83
Asian (%)	2.86	5.17	4.66	3.89	3.85	4.36	4.97
Native American (%)	0.08	0.10	0.18	0.22	0.17	0.18	0.19
Others (%)	2.22	5.18	6.07	5.42	3.64	5.40	5.67
Hispanic (%)	2.49	8.46	9.08	8.95	5.49	8.41	10.47
Color (%)	12.58	20.48	42.78	25.84	23.84	31.74	26.45
Female (%)	49.99	51.45	52.53	51.30	51.37	51.81	51.14
Old (65 + years) (%)	11.65	13.86	13.69	14.17	12.23	13.67	14.75
Kid (< 5 years) (%)	6.75	6.17	6.34	6.07	6.27	6.24	5.88
Native-born (%)	95.33	90.73	90.30	91.51	92.30	91.08	87.44
Renter housing units (%)	19.91	25.96	31.64	26.37	23.71	28.20	26.72
College degree or higher (%)	35.90	41.46	30.11	27.73	27.26	31.01	29.09
Unemployment (%)	5.41	5.88	9.24	7.63	7.37	7.93	7.29
Poverty (%)	5.36	8.28	16.44	10.08	8.34	12.26	10.51
Mean household income ($)	93,455	96,613	70,631	77,758	75,337	77,828	77,247
Index	48	48	48	48	48	48	48

Table B. 96

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Limerick Generating Station, Pennsylvania

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	5446	0.85	3837	78.40	1609	70.94	7.454***	(8.73)
Black	5446	0.76	3837	11.00	1609	18.83	-7.828***	(-10.35)
Asian	5446	0.20	3837	4.36	1609	4.13	0.232	(1.17)
Native American	5446	0.02	3837	0.19	1609	0.18	0.0056	(0.37)
Others	5446	0.26	3837	5.48	1609	5.29	0.185	(0.71)
Hispanic	5446	0.43	3837	9.92	1609	8.28	1.639***	(3.80)
Color	5446	0.90	3837	26.49	1609	32.38	-5.896***	(-6.52)
White (2000)	5446	0.85	3837	81.09	1609	74.68	6.418***	(7.56)
Black	5446	0.76	3837	10.44	1609	17.47	-7.036***	(-9.25)
Asian	5446	0.15	3837	3.15	1609	2.97	0.183	(1.24)
Native American	5446	0.01	3837	0.20	1609	0.21	-0.0145	(-1.14)
Others	5446	0.24	3837	4.97	1609	4.52	0.449	(1.88)
Hispanic	5446	0.36	3837	7.48	1609	5.59	1.894***	(5.25)
Color	5446	0.89	3837	22.39	1609	27.23	-4.845***	(-5.44)
White (1990)	5446	0.81	3837	86.27	1609	81.03	5.234***	(6.47)
Black	5446	0.75	3837	9.47	1609	14.97	-5.499***	(-7.31)
Asian	5446	0.10	3837	1.98	1609	1.85	0.126	(1.24)
Native American	5446	0.01	3837	0.18	1609	0.16	0.0246*	(2.33)
Others	5446	0.19	3837	1.96	1609	1.88	0.0832	(0.45)
Hispanic	5446	0.29	3837	5.25	1609	3.28	1.967***	(6.90)
Color	5446	0.83	3837	16.56	1609	20.08	-3.515***	(-4.23)

*p<0.05, **p<0.01, ***p<0.001

49. Peach Bottom Atomic Power Station, Pennsylvania

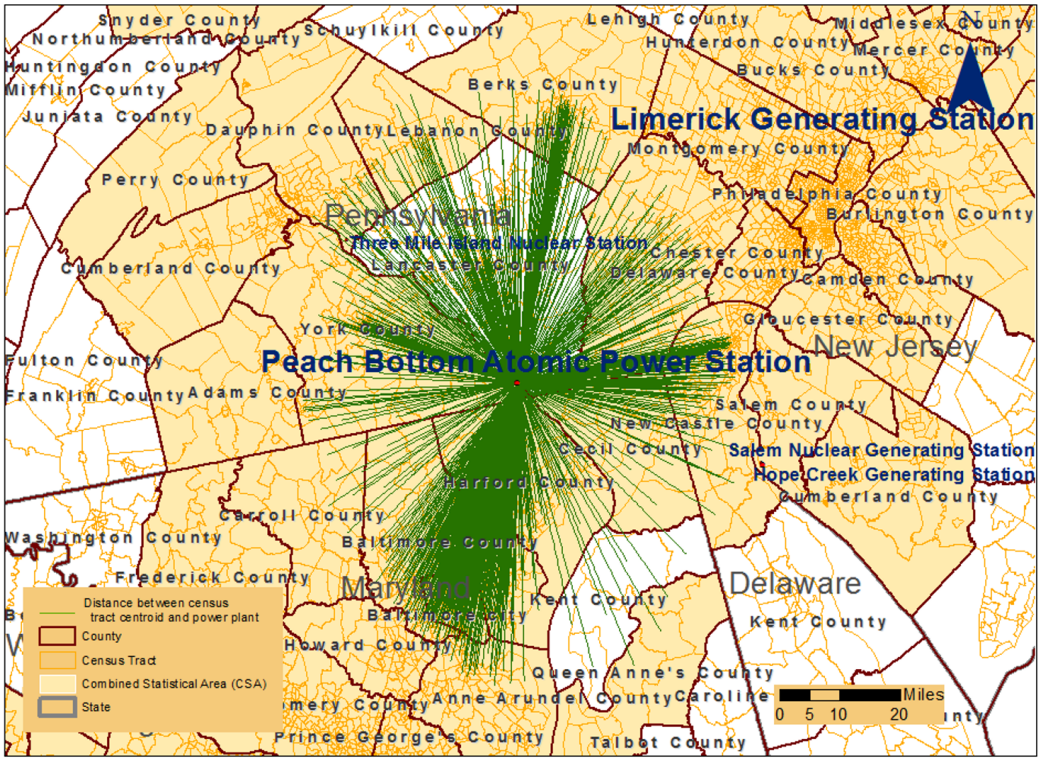

Figure B. 49 Distance to census-tract center points of census tracts within a 50-mile radius of Peach Bottom Atomic Power Station, Pennsylvania in 1990, 2000, and 2010

Table B. 97

Demographic Composition of Population, as sorted by Distance from Peach Bottom Atomic Power Station, Pennsylvania in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	10	81	228	485	204	1,008	3,834
Tract area (sq. mile)	317	966	1,579	1,909	1,023	5,794	55,155
Total population	35,760	291,208	821,840	1,702,769	718,048	3,569,625	13,759,639
White	34,789	269,850	747,917	1,171,446	610,100	2,834,102	11,620,667
Black	693	14,051	46,719	499,072	85,484	646,019	1,742,575
Asian	171	2,703	14,232	18,641	10,491	46,238	235,281
Native American	56	462	1,526	4,181	1,517	7,742	24,682
Others	61	4,126	11,433	9,443	10,447	35,510	136,391
Hispanic	226	7,205	21,130	23,351	21,951	73,863	281,754
Color	1,108	23,956	82,927	542,986	118,188	769,165	2,269,976
White (%)	97.28	92.67	91.01	68.80	84.97	79.39	84.45
Black (%)	1.94	4.83	5.68	29.31	11.91	18.10	12.66
Asian (%)	0.48	0.93	1.73	1.09	1.46	1.30	1.71
Native American (%)	0.16	0.16	0.19	0.25	0.21	0.22	0.18
Others (%)	0.17	1.42	1.39	0.55	1.45	0.99	0.99
Hispanic (%)	0.63	2.47	2.57	1.37	3.06	2.07	2.05
Color (%)	3.10	8.23	10.09	31.89	16.46	21.55	16.50
Female (%)	49.56	50.81	51.12	52.31	51.99	51.82	51.93
Old (65 + years) (%)	10.65	11.11	11.60	13.24	14.25	12.87	14.30
Kid (< 5 years) (%)	9.69	9.45	8.81	8.77	8.45	8.78	8.17
Native-born (%)	99.32	97.96	96.67	96.69	97.00	96.88	95.69
Renter housing units (%)	16.57	24.15	29.20	35.88	31.19	32.36	27.12
Education (%)	9.30	17.33	23.32	19.70	16.21	19.52	20.63
Unemployment (%)	4.22	3.50	3.29	5.59	4.47	4.63	5.60
Poverty (%)	7.41	6.55	6.86	12.08	8.56	9.68	10.39
Mean household income ($)	63,748	69,715	73,801	66,101	63,128	67,489	65,008
Year 2000							
Total population	40,396	344,798	931,445	1,759,116	769,821	3,845,576	14,515,564
White	39,286	314,594	807,708	1,138,072	596,443	2,896,103	11,565,779
Black	531	16,111	62,687	542,850	114,133	736,312	2,092,423
Asian	202	3,514	22,303	30,882	17,572	74,473	374,010
Native American	30	563	1,915	4,504	2,250	9,262	29,011
Others	354	10,020	36,825	42,800	39,428	129,427	454,340
Hispanic	297	12,121	44,816	44,060	48,682	149,976	506,571
Color	1,310	35,048	143,047	642,036	190,731	1,012,172	3,165,543
White (%)	97.25	91.24	86.72	64.70	77.48	75.31	79.68
Black (%)	1.31	4.67	6.73	30.86	14.83	19.15	14.42
Asian (%)	0.50	1.02	2.39	1.76	2.28	1.94	2.58
Native American (%)	0.07	0.16	0.21	0.26	0.29	0.24	0.20
Others (%)	0.88	2.91	3.95	2.43	5.12	3.37	3.13
Hispanic (%)	0.74	3.52	4.81	2.50	6.32	3.90	3.49
Color (%)	3.24	10.16	15.36	36.50	24.78	26.32	21.81
Female (%)	49.66	50.98	51.29	52.34	51.89	51.84	51.71
Old (65 + years) (%)	11.10	11.85	12.70	13.15	14.48	13.17	14.56
Kid (< 5 years) (%)	8.46	8.08	7.94	7.64	7.83	7.80	7.38
Native-born (%)	98.60	97.25	94.95	94.85	95.14	95.19	93.89
Renter housing units (%)	14.92	21.42	27.57	32.48	30.37	29.83	26.34
College degree or higher (%)	13.70	22.60	28.06	25.01	20.18	24.44	25.21
Unemployment (%)	3.23	3.16	4.08	5.75	5.00	4.92	5.48
Poverty (%)	5.82	6.53	7.20	11.71	10.04	9.75	10.30
Mean household income ($)	69,195	75,538	78,651	71,599	67,536	72,773	70,781
Year 2010							
Total population	43,032	387,349	1,024,312	1,847,088	822,243	4,124,024	15,066,382
White	41,506	347,498	851,839	1,144,429	595,702	2,980,974	11,501,764
Black	763	22,544	92,530	584,976	137,182	837,995	2,359,545
Asian	119	5,046	37,446	55,118	25,725	123,454	547,915
Native American	56	749	2,136	4,879	1,509	9,329	28,165
Others	588	11,512	40,361	57,686	62,125	172,272	628,993
Hispanic	752	21,957	74,840	87,726	85,660	270,935	882,434
Color	1,927	54,631	219,035	755,927	262,768	1,294,288	4,006,588
White (%)	96.45	89.71	83.16	61.96	72.45	72.28	76.34

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	1.77	5.82	9.03	31.67	16.68	20.32	15.66
Asian (%)	0.28	1.30	3.66	2.98	3.13	2.99	3.64
Native American (%)	0.13	0.19	0.21	0.26	0.18	0.23	0.19
Others (%)	1.37	2.97	3.94	3.12	7.56	4.18	4.17
Hispanic (%)	1.75	5.67	7.31	4.75	10.42	6.57	5.86
Color (%)	4.48	14.10	21.38	40.93	31.96	31.38	26.59
Female (%)	49.04	50.67	51.35	52.34	51.63	51.76	51.34
Old (65 + years) (%)	12.65	12.87	13.41	12.81	13.71	13.14	14.50
Kid (< 5 years) (%)	5.47	6.22	6.48	6.35	6.48	6.39	5.87
Native-born (%)	98.44	96.31	92.52	92.19	92.50	92.78	91.84
Renter housing units (%)	13.08	20.85	26.66	31.04	29.70	28.67	25.62
College degree or higher (%)	14.75	26.10	31.65	30.15	24.02	28.77	29.28
Unemployment (%)	7.06	5.54	5.88	7.57	7.61	6.96	7.09
Poverty (%)	8.30	7.87	8.99	11.81	12.35	10.81	11.28
Mean household income ($)	74,946	80,493	80,633	75,452	69,182	75,930	74,175
Index	49	49	49	49	49	49	49

Table B. 98

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Peach Bottom Atomic Power Station, Pennsylvania

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	4842	1.08	3834	75.59	1008	69.23	6.356***	(5.88)
Black	4842	1.04	3834	16.14	1008	22.89	-6.747***	(-6.46)
Asian	4842	0.15	3834	3.28	1008	2.79	0.491**	(3.21)
Native American	4842	0.02	3834	0.18	1008	0.24	-0.0594**	(-2.79)
Others	4842	0.24	3834	3.92	1008	4.35	-0.431	(-1.83)
Hispanic	4842	0.41	3834	5.45	1008	6.96	-1.509***	(-3.71)
Color	4842	1.10	3834	26.29	1008	34.12	-7.832***	(-7.13)
White (2000)	4842	1.07	3834	79.25	1008	73.31	5.935***	(5.56)
Black	4842	1.04	3834	14.94	1008	20.84	-5.900***	(-5.69)
Asian	4842	0.12	3834	2.46	1008	1.92	0.539***	(4.68)
Native American	4842	0.02	3834	0.21	1008	0.27	-0.0587***	(-3.34)
Others	4842	0.21	3834	3.04	1008	3.59	-0.552**	(-2.66)
Hispanic	4842	0.29	3834	3.31	1008	4.21	-0.904**	(-3.07)
Color	4842	1.08	3834	22.04	1008	28.30	-6.261***	(-5.80)
White (1990)	4842	1.00	3834	84.58	1008	80.16	4.421***	(4.42)
Black	4842	0.98	3834	12.55	1008	17.07	-4.519***	(-4.62)
Asian	4842	0.09	3834	1.68	1008	1.32	0.356***	(4.06)
Native American	4842	0.02	3834	0.19	1008	0.22	-0.0284	(-1.87)
Others	4842	0.14	3834	0.91	1008	1.09	-0.185	(-1.34)
Hispanic	4842	0.20	3834	1.95	1008	2.25	-0.305	(-1.56)
Color	4842	1.00	3834	16.25	1008	20.62	-4.363***	(-4.37)

*p<0.05, **p<0.01, ***p<0.001

50. Susquehanna Steam Electric Station, Pennsylvania

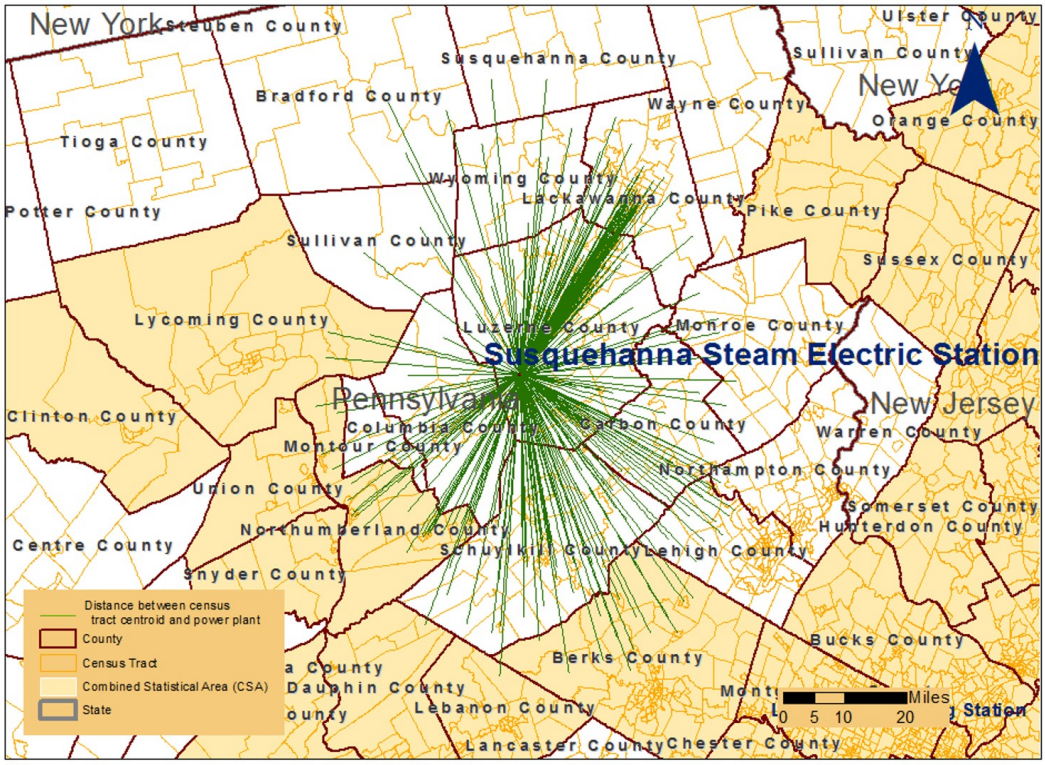

Figure B. 50 Distance to census-tract center points of census tracts within a 50-mile radius of Susquehanna Steam Electric Station, Pennsylvania in 1990, 2000, and 2010

Table B. 99

Demographic Composition of Population, as sorted by Distance from Susquehanna Steam Electric Station, Pennsylvania in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	14	84	77	97	31	303	2,915
Tract area (sq. mile)	287	1,075	1,627	1,746	1,128	5,863	40,192
Total population	51,798	271,019	291,624	369,871	118,025	1,102,337	10,779,295
White	51,037	265,342	289,016	364,679	116,600	1,086,674	9,436,499
Black	495	3,600	1,121	2,235	616	8,067	1,079,491
Asian	211	1,161	892	1,784	386	4,434	130,648
Native American	27	159	219	408	103	916	15,051
Others	29	746	382	778	300	2,235	117,574
Hispanic	289	1,794	1,143	2,412	880	6,518	213,956
Color	996	6,714	3,410	6,852	1,951	19,923	1,430,575
White (%)	98.53	97.91	99.11	98.60	98.79	98.58	87.54
Black (%)	0.96	1.33	0.38	0.60	0.52	0.73	10.01
Asian (%)	0.41	0.43	0.31	0.48	0.33	0.40	1.21
Native American (%)	0.05	0.06	0.08	0.11	0.09	0.08	0.14
Others (%)	0.06	0.28	0.13	0.21	0.25	0.20	1.09
Hispanic (%)	0.56	0.66	0.39	0.65	0.75	0.59	1.98
Color (%)	1.92	2.48	1.17	1.85	1.65	1.81	13.27
Female (%)	51.51	52.69	52.55	52.20	50.28	52.17	52.07
Old (65 + years) (%)	17.26	19.27	20.22	17.37	12.58	18.07	15.13
Kid (< 5 years) (%)	7.54	6.97	7.07	7.71	8.07	7.39	8.08
Native-born (%)	98.69	98.37	98.57	98.39	98.69	98.48	96.73
Renter housing units (%)	20.01	30.27	20.33	25.36	17.94	24.19	26.98
Education (%)	11.14	12.48	10.32	13.33	11.85	12.05	18.56
Unemployment (%)	5.92	6.00	6.35	5.41	4.21	5.67	6.00
Poverty (%)	9.11	11.70	11.14	9.78	8.44	10.43	11.20
Mean household income ($)	53,076	47,121	47,544	52,612	58,235	50,447	61,232
Year 2000							
Total population	53,318	262,272	290,229	377,812	132,857	1,116,488	11,164,566
White	51,573	252,219	282,224	365,141	129,902	1,081,059	9,405,118
Black	989	5,003	4,265	4,725	805	15,787	1,195,882
Asian	271	1,320	1,194	2,601	546	5,932	214,420
Native American	99	372	280	529	181	1,461	18,050
Others	389	3,346	2,268	4,829	1,391	12,223	331,122
Hispanic	569	3,410	2,799	5,862	1,800	14,440	377,681
Color	2,140	11,743	9,578	15,644	3,950	43,055	1,910,001
White (%)	96.73	96.17	97.24	96.65	97.78	96.83	84.24
Black (%)	1.85	1.91	1.47	1.25	0.61	1.41	10.71
Asian (%)	0.51	0.50	0.41	0.69	0.41	0.53	1.92
Native American (%)	0.19	0.14	0.10	0.14	0.14	0.13	0.16
Others (%)	0.73	1.28	0.78	1.28	1.05	1.09	2.97
Hispanic (%)	1.07	1.30	0.96	1.55	1.35	1.29	3.38
Color (%)	4.01	4.48	3.30	4.14	2.97	3.86	17.11
Female (%)	50.52	51.93	51.12	51.73	50.20	51.38	51.77
Old (65 + years) (%)	17.22	19.18	20.01	17.31	13.20	17.96	15.40
Kid (< 5 years) (%)	6.21	6.09	5.96	6.50	6.85	6.29	7.28
Native-born (%)	98.36	98.08	98.53	97.97	98.29	98.20	95.63
Renter housing units (%)	19.62	28.64	19.95	24.04	17.44	23.11	26.43
College degree or higher (%)	13.78	15.25	14.28	16.86	16.09	15.56	23.06
Unemployment (%)	6.32	6.23	5.69	4.85	5.52	5.53	5.68
Poverty (%)	9.88	12.60	10.25	9.49	8.16	10.27	11.05
Mean household income ($)	56,513	51,664	52,833	57,830	66,608	55,919	66,631
Year 2010							
Total population	55,117	264,433	292,379	385,363	139,000	1,136,292	11,476,413
White	53,031	242,828	279,934	362,588	133,583	1,071,964	9,388,132
Black	797	10,266	6,394	9,364	1,883	28,704	1,318,348
Asian	623	2,368	1,551	4,658	881	10,081	325,366
Native American	122	276	513	462	99	1,472	16,733
Others	544	8,695	3,987	8,291	2,554	24,071	427,834
Hispanic	1,214	16,572	6,865	14,718	3,641	43,010	613,498
Color	3,088	31,046	16,898	31,980	7,636	90,648	2,397,756
White (%)	96.22	91.83	95.74	94.09	96.10	94.34	81.80

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	1.45	3.88	2.19	2.43	1.35	2.53	11.49
Asian (%)	1.13	0.90	0.53	1.21	0.63	0.89	2.84
Native American (%)	0.22	0.10	0.18	0.12	0.07	0.13	0.15
Others (%)	0.99	3.29	1.36	2.15	1.84	2.12	3.73
Hispanic (%)	2.20	6.27	2.35	3.82	2.62	3.79	5.35
Color (%)	5.60	11.74	5.78	8.30	5.49	7.98	20.89
Female (%)	50.59	51.49	50.03	51.19	50.13	50.80	51.38
Old (65 + years) (%)	16.87	17.39	18.60	16.98	14.10	17.13	15.09
Kid (< 5 years) (%)	4.61	5.19	5.11	5.35	5.27	5.21	5.82
Native-born (%)	97.76	95.45	97.86	96.80	97.88	96.94	94.17
Renter housing units (%)	18.66	28.44	20.32	23.32	18.17	22.91	26.17
College degree or higher (%)	17.19	18.20	18.16	19.96	19.56	18.89	27.15
Unemployment (%)	5.64	7.00	8.04	6.45	6.37	6.92	7.33
Poverty (%)	10.54	15.86	11.66	11.79	8.73	12.26	12.39
Mean household income ($)	56,670	52,042	55,312	58,621	66,313	57,003	68,322
Index	50	50	50	50	50	50	50

Table B. 100

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Susquehanna Steam Electric Station, Pennsylvania

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	3218	0.70	2915	80.26	303	93.94	-13.68***	(-19.67)
Black	3218	0.50	2915	12.71	303	2.48	10.23***	(20.38)
Asian	3218	0.13	2915	2.64	303	0.90	1.741***	(13.32)
Native American	3218	0.02	2915	0.15	303	0.13	0.0161	(0.65)
Others	3218	0.22	2915	3.65	303	2.22	1.435***	(6.59)
Hispanic	3218	0.46	2915	5.13	303	4.09	1.032*	(2.25)
Color	3218	0.76	2915	21.76	303	8.25	13.51***	(17.89)
White (2000)	3218	0.53	2915	83.18	303	96.80	-13.62***	(-25.75)
Black	3218	0.46	2915	11.67	303	1.37	10.30***	(22.31)
Asian	3218	0.09	2915	1.89	303	0.59	1.301***	(14.98)
Native American	3218	0.05	2915	0.17	303	0.18	-0.00193	(-0.04)
Others	3218	0.15	2915	3.02	303	1.18	1.831***	(12.01)
Hispanic	3218	0.19	2915	3.38	303	1.34	2.040***	(10.80)
Color	3218	0.55	2915	18.07	303	3.89	14.18***	(25.55)
White (1990)	3218	0.46	2915	87.68	303	98.65	-10.96***	(-23.60)
Black	3218	0.43	2915	9.87	303	0.71	9.164***	(21.11)
Asian	3218	0.07	2915	1.21	303	0.44	0.766***	(10.69)
Native American	3218	0.02	2915	0.15	303	0.09	0.0579**	(2.79)
Others	3218	0.09	2915	1.04	303	0.22	0.818***	(8.87)
Hispanic	3218	0.13	2915	1.95	303	0.63	1.323***	(10.40)
Color	3218	0.47	2915	13.08	303	1.75	11.33***	(24.04)

*p<0.05, **p<0.01, ***p<0.001

51. Three Mile Island Nuclear Station, Pennsylvania

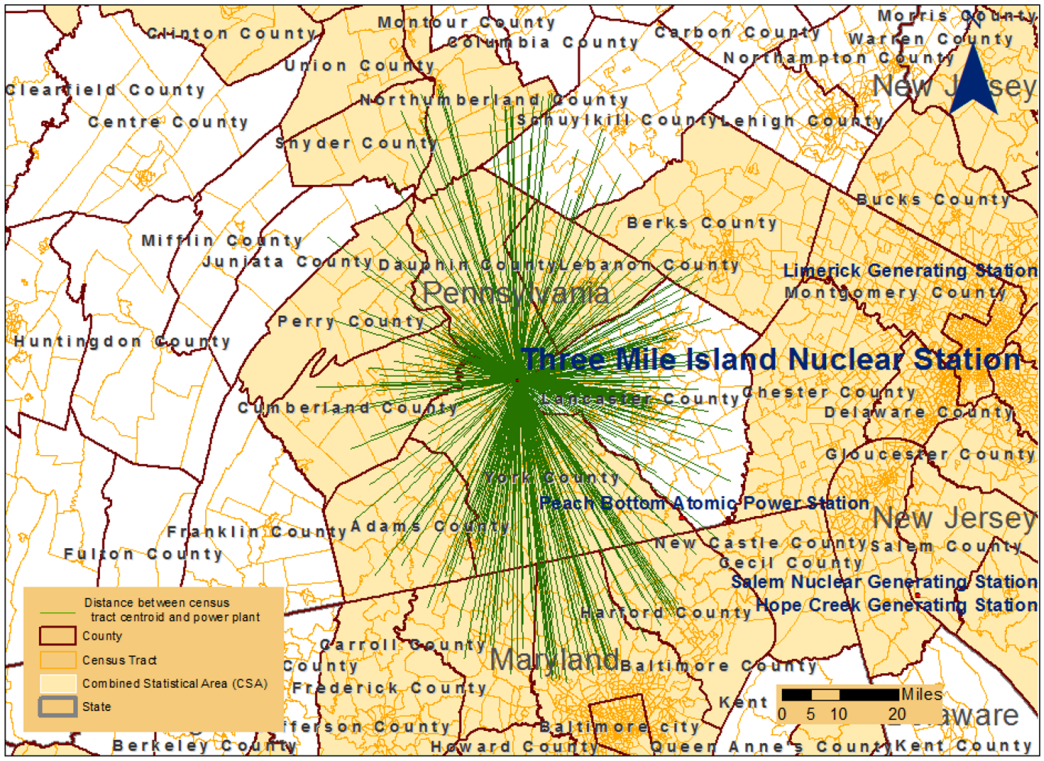

Figure B. 51 Distance to census-tract center points of census tracts within a 50-mile radius of Three Mile Island Nuclear Station, Pennsylvania in 1990, 2000, and 2010

Table B. 101

Demographic Composition of Population, as sorted by Distance from Three Mile Island Nuclear Station, Pennsylvania in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	41	150	118	74	65	448	4,176
Tract area (sq. mile)	297	933	1,520	2,098	1,093	5,941	52,519
Total population	156,537	568,626	476,325	293,340	223,969	1,718,797	14,944,296
White	145,102	516,219	450,334	289,009	218,524	1,619,188	12,300,242
Black	8,529	40,264	10,337	2,013	3,254	64,397	2,212,075
Asian	1,367	6,012	4,606	1,081	1,448	14,514	258,234
Native American	313	794	571	220	314	2,212	28,012
Others	1,238	5,309	10,466	1,022	425	18,460	145,702
Hispanic	2,409	9,714	16,221	2,384	1,198	31,926	308,538
Color	12,590	56,304	31,016	5,666	6,257	111,833	2,790,162
White (%)	92.70	90.78	94.54	98.52	97.57	94.20	82.31
Black (%)	5.45	7.08	2.17	0.69	1.45	3.75	14.80
Asian (%)	0.87	1.06	0.97	0.37	0.65	0.84	1.73
Native American (%)	0.20	0.14	0.12	0.07	0.14	0.13	0.19
Others (%)	0.79	0.93	2.20	0.35	0.19	1.07	0.97
Hispanic (%)	1.54	1.71	3.41	0.81	0.53	1.86	2.06
Color (%)	8.04	9.90	6.51	1.93	2.79	6.51	18.67
Female (%)	51.73	51.68	51.36	50.42	51.51	51.36	51.99
Old (65 + years) (%)	13.52	13.87	13.67	12.21	13.68	13.47	14.15
Kid (< 5 years) (%)	8.05	8.08	8.54	9.07	8.57	8.44	8.26
Native-born (%)	98.01	97.95	98.02	98.93	98.29	98.18	95.64
Renter housing units (%)	27.73	29.62	28.82	19.57	20.02	26.37	28.48
Education (%)	17.02	19.25	14.93	11.85	19.73	16.70	20.78
Unemployment (%)	3.76	3.82	3.42	3.16	3.88	3.60	5.68
Poverty (%)	7.03	7.04	7.60	6.74	7.02	7.14	10.67
Mean household income ($)	62,567	64,844	60,486	61,943	71,398	63,803	65,556
Year 2000							
Total population	177,279	618,682	521,514	329,596	258,966	1,906,037	15,671,503
White	159,236	539,121	479,171	319,472	247,414	1,744,414	12,132,784
Black	10,592	48,334	13,859	2,961	5,955	81,701	2,598,211
Asian	2,777	9,539	6,197	2,432	2,630	23,575	408,520
Native American	235	917	675	442	472	2,741	32,421
Others	4,454	20,735	21,585	4,313	2,509	53,596	499,577
Hispanic	4,874	21,767	30,131	5,181	2,444	64,397	554,829
Color	20,286	87,669	54,181	12,808	13,151	188,095	3,774,376
White (%)	89.82	87.14	91.88	96.93	95.54	91.52	77.42
Black (%)	5.97	7.81	2.66	0.90	2.30	4.29	16.58
Asian (%)	1.57	1.54	1.19	0.74	1.02	1.24	2.61
Native American (%)	0.13	0.15	0.13	0.13	0.18	0.14	0.21
Others (%)	2.51	3.35	4.14	1.31	0.97	2.81	3.19
Hispanic (%)	2.75	3.52	5.78	1.57	0.94	3.38	3.54
Color (%)	11.44	14.17	10.39	3.89	5.08	9.87	24.08
Female (%)	51.62	51.41	51.14	50.29	50.78	51.08	51.83
Old (65 + years) (%)	13.68	14.63	14.40	13.26	13.45	14.08	14.36
Kid (< 5 years) (%)	7.35	7.20	7.70	7.85	7.35	7.48	7.45
Native-born (%)	96.81	96.85	96.89	97.88	97.69	97.15	93.80
Renter housing units (%)	26.00	27.73	26.88	18.88	17.79	24.58	27.48
College degree or higher (%)	23.05	23.78	18.70	16.06	25.13	21.21	25.52
Unemployment (%)	3.29	3.72	3.59	3.37	3.44	3.55	5.60
Poverty (%)	6.54	7.40	7.72	6.59	6.26	7.11	10.60
Mean household income ($)	68,924	69,167	65,922	66,958	78,348	69,104	71,261
Year 2010							
Total population	191,325	682,479	561,898	357,731	275,252	2,068,685	16,240,443
White	163,766	577,673	504,793	342,331	258,225	1,846,788	12,009,524
Black	14,572	59,853	19,086	5,373	8,488	107,372	2,904,915
Asian	4,489	15,871	9,683	2,463	4,143	36,649	606,349
Native American	176	1,352	688	532	507	3,255	31,163
Others	8,322	27,730	27,648	7,032	3,889	74,621	688,492
Hispanic	9,836	39,676	46,888	9,213	5,959	111,572	974,882
Color	32,310	126,631	81,083	20,474	21,185	281,683	4,723,573
White (%)	85.60	84.64	89.84	95.70	93.81	89.27	73.95

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	7.62	8.77	3.40	1.50	3.08	5.19	17.89
Asian (%)	2.35	2.33	1.72	0.69	1.51	1.77	3.73
Native American (%)	0.09	0.20	0.12	0.15	0.18	0.16	0.19
Others (%)	4.35	4.06	4.92	1.97	1.41	3.61	4.24
Hispanic (%)	5.14	5.81	8.34	2.58	2.16	5.39	6.00
Color (%)	16.89	18.55	14.43	5.72	7.70	13.62	29.09
Female (%)	51.12	51.22	51.07	50.66	50.74	51.01	51.48
Old (65 + years) (%)	13.08	14.70	14.92	14.49	14.11	14.50	14.19
Kid (< 5 years) (%)	6.71	5.98	6.19	6.19	5.67	6.10	5.95
Native-born (%)	95.58	95.07	95.75	97.51	96.53	95.92	91.56
Renter housing units (%)	25.62	27.52	26.58	18.58	16.57	24.20	26.74
College degree or higher (%)	25.91	27.64	21.40	19.27	28.98	24.54	29.84
Unemployment (%)	5.30	5.89	6.17	4.98	5.40	5.69	7.24
Poverty (%)	9.12	9.36	9.54	7.02	7.36	8.71	11.50
Mean household income ($)	69,255	70,611	65,528	70,953	85,147	71,013	74,991
Index	51	51	51	51	51	51	51

Table B. 102

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Three Mile Island Nuclear Station, Pennsylvania

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	4624	0.88	4176	72.98	448	88.04	-15.06***	(-17.12)
Black	4624	0.72	4176	18.61	448	6.19	12.42***	(17.15)
Asian	4624	0.14	4176	3.36	448	1.75	1.610***	(11.62)
Native American	4624	0.02	4176	0.19	448	0.16	0.028	(1.41)
Others	4624	0.28	4176	4.03	448	3.87	0.161	(0.58)
Hispanic	4624	0.48	4176	5.66	448	5.98	-0.317	(-0.66)
Color	4624	1.03	4176	29.07	448	15.17	13.90***	(13.55)
White (2000)	4624	0.88	4176	76.86	448	90.26	-13.40***	(-15.23)
Black	4624	0.71	4176	17.21	448	5.28	11.93***	(16.80)
Asian	4624	0.09	4176	2.50	448	1.24	1.261***	(13.48)
Native American	4624	0.02	4176	0.22	448	0.16	0.0585***	(3.66)
Others	4624	0.27	4176	3.13	448	3.07	0.0562	(0.21)
Hispanic	4624	0.37	4176	3.41	448	3.74	-0.328	(-0.89)
Color	4624	0.95	4176	24.47	448	11.26	13.21***	(13.96)
White (1990)	4624	0.78	4176	82.75	448	93.58	-10.83***	(-13.87)
Black	4624	0.68	4176	14.33	448	4.33	9.999***	(14.61)
Asian	4624	0.07	4176	1.71	448	0.85	0.856***	(12.69)
Native American	4624	0.01	4176	0.20	448	0.14	0.0583***	(4.06)
Others	4624	0.19	4176	0.93	448	1.09	-0.168	(-0.90)
Hispanic	4624	0.25	4176	2.02	448	1.90	0.12	(0.49)
Color	4624	0.80	4176	18.10	448	7.14	10.96***	(13.61)

*p<0.05, **p<0.01, ***p<0.001

52. Catawba Nuclear Station, South Carolina

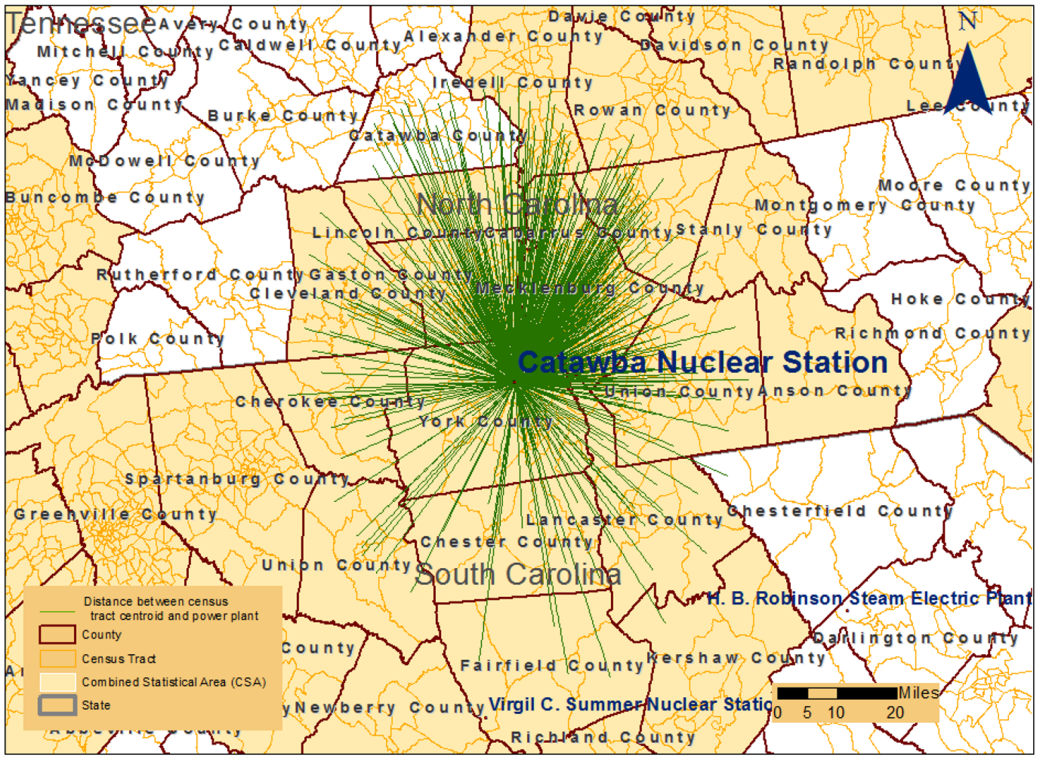

Figure B. 52 Distance to census-tract center points of census tracts within a 50-mile radius of Catawba Nuclear Station, South Carolina in 1990, 2000, and 2010

Table B. 103

Demographic Composition of Population, as sorted by Distance from Catawba Nuclear Station, South Carolina in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	46	192	165	108	45	556	2,742
Tract area (sq. mile)	309	824	1,695	2,276	1,300	6,403	79,437
Total population	101,221	506,174	375,954	306,069	148,143	1,437,561	8,677,741
White	85,352	374,242	287,011	250,088	124,291	1,120,984	6,297,939
Black	14,449	122,466	83,012	53,605	22,835	296,367	2,198,973
Asian	798	5,916	3,473	985	463	11,635	60,053
Native American	419	1,868	1,536	784	306	4,913	86,626
Others	214	1,676	916	612	253	3,671	34,150
Hispanic	627	5,375	2,422	1,670	550	10,644	86,704
Color	16,263	135,152	90,326	56,959	24,141	322,841	2,423,255
White (%)	84.32	73.94	76.34	81.71	83.90	77.98	72.58
Black (%)	14.27	24.19	22.08	17.51	15.41	20.62	25.34
Asian (%)	0.79	1.17	0.92	0.32	0.31	0.81	0.69
Native American (%)	0.41	0.37	0.41	0.26	0.21	0.34	1.00
Others (%)	0.21	0.33	0.24	0.20	0.17	0.26	0.39
Hispanic (%)	0.62	1.06	0.64	0.55	0.37	0.74	1.00
Color (%)	16.07	26.70	24.03	18.61	16.30	22.46	27.92
Female (%)	51.99	52.36	51.47	51.89	51.30	51.89	51.53
Old (65 + years) (%)	10.57	10.72	9.45	12.87	13.87	11.16	11.96
Kid (< 5 years) (%)	8.43	8.84	9.07	8.08	7.89	8.61	8.39
Native-born (%)	98.38	97.27	98.20	99.21	99.36	98.22	98.39
Renter housing units (%)	27.25	36.73	27.35	22.96	20.29	29.08	27.73
Education (%)	20.31	24.62	15.15	12.06	9.25	17.59	17.05
Unemployment (%)	4.34	4.39	4.36	4.60	3.78	4.36	5.18
Poverty (%)	8.76	11.06	9.75	10.77	9.29	10.31	14.39
Mean household income ($)	65,223	66,912	57,991	54,520	50,828	60,268	52,954
Year 2000							
Total population	137,392	596,426	521,467	385,237	179,167	1,819,689	10,241,636
White	110,288	416,181	360,546	312,168	147,562	1,346,745	7,151,098
Black	21,441	143,626	127,229	60,596	25,027	377,919	2,538,962
Asian	1,950	12,971	10,344	1,921	1,770	28,956	123,924
Native American	862	3,129	2,264	1,165	657	8,077	107,567
Others	2,864	20,508	21,073	9,407	4,147	57,999	320,078
Hispanic	3,459	29,849	26,838	14,721	5,608	80,475	385,317
Color	28,947	194,624	172,093	80,278	34,100	510,042	3,247,929
White (%)	80.27	69.78	69.14	81.03	82.36	74.01	69.82
Black (%)	15.61	24.08	24.40	15.73	13.97	20.77	24.79
Asian (%)	1.42	2.17	1.98	0.50	0.99	1.59	1.21
Native American (%)	0.63	0.52	0.43	0.30	0.37	0.44	1.05
Others (%)	2.08	3.44	4.04	2.44	2.31	3.19	3.13
Hispanic (%)	2.52	5.00	5.15	3.82	3.13	4.42	3.76
Color (%)	21.07	32.63	33.00	20.84	19.03	28.03	31.71
Female (%)	51.84	51.23	50.84	50.99	50.30	51.02	51.21
Old (65 + years) (%)	10.10	10.43	8.83	12.19	12.70	10.54	12.34
Kid (< 5 years) (%)	8.35	8.30	8.88	8.29	7.84	8.42	7.90
Native-born (%)	96.29	92.64	93.15	96.24	96.87	94.24	95.69
Renter housing units (%)	26.50	34.97	26.73	22.44	20.37	27.95	25.98
College degree or higher (%)	26.82	31.48	22.52	18.49	12.77	23.98	21.40
Unemployment (%)	5.94	5.63	4.78	4.99	4.11	5.13	5.57
Poverty (%)	8.57	10.44	9.73	9.89	9.31	9.87	13.43
Mean household income ($)	73,800	81,761	67,243	67,343	59,438	71,896	61,009
Year 2010							
Total population	200,869	693,864	670,767	464,075	205,922	2,235,497	11,547,109
White	152,165	471,548	418,438	372,209	167,638	1,581,998	7,905,729
Black	35,104	161,031	190,158	69,123	27,425	482,841	2,767,585
Asian	5,771	23,823	18,911	6,456	3,427	58,388	198,116
Native American	556	3,374	2,981	1,405	440	8,756	111,365
Others	7,273	34,088	40,279	14,882	6,992	103,514	564,314
Hispanic	14,464	58,967	63,030	31,482	12,116	180,059	752,103
Color	58,960	256,111	284,248	113,063	45,505	757,887	3,987,980
White (%)	75.75	67.96	62.38	80.20	81.41	70.77	68.47

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	17.48	23.21	28.35	14.89	13.32	21.60	23.97
Asian (%)	2.87	3.43	2.82	1.39	1.66	2.61	1.72
Native American (%)	0.28	0.49	0.44	0.30	0.21	0.39	0.96
Others (%)	3.62	4.91	6.00	3.21	3.40	4.63	4.89
Hispanic (%)	7.20	8.50	9.40	6.78	5.88	8.05	6.51
Color (%)	29.35	36.91	42.38	24.36	22.10	33.90	34.54
Female (%)	51.82	51.64	51.28	51.12	50.60	51.34	51.27
Old (65 + years) (%)	10.03	10.52	9.27	12.45	13.22	10.75	13.19
Kid (< 5 years) (%)	7.45	7.17	7.41	6.88	6.38	7.14	6.57
Native-born (%)	92.75	89.74	90.29	94.34	95.55	91.67	93.86
Renter housing units (%)	25.73	32.68	27.48	23.41	21.19	27.57	26.46
College degree or higher (%)	32.92	36.63	25.99	22.89	16.67	28.42	24.82
Unemployment (%)	8.22	9.49	9.53	9.76	9.16	9.41	8.81
Poverty (%)	10.07	14.15	13.50	13.39	12.46	13.28	16.31
Mean household income ($)	72,266	79,641	62,770	65,891	57,326	69,185	59,269
Index	52	52	52	52	52	52	52

Table B. 104

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Catawba Nuclear Station, South Carolina

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	3298	1.18	2742	67.48	556	68.88	-1.405	(-1.19)
Black	3298	1.07	2742	24.04	556	22.97	1.067	(1.00)
Asian	3298	0.18	2742	1.66	556	2.61	-0.953***	(-5.35)
Native American	3298	0.11	2742	0.93	556	0.39	0.543***	(5.11)
Others	3298	0.24	2742	4.58	556	4.61	-0.0254	(-0.11)
Hispanic	3298	0.42	2742	6.08	556	7.92	-1.835***	(-4.36)
Color	3298	1.23	2742	34.04	556	35.06	-1.023	(-0.83)
White (2000)	3298	1.12	2742	70.39	556	73.80	-3.413**	(-3.05)
Black	3298	1.04	2742	24.23	556	20.79	3.439***	(3.31)
Asian	3298	0.10	2742	1.23	556	1.66	-0.427***	(-4.19)
Native American	3298	0.11	2742	1.02	556	0.45	0.566***	(5.25)
Others	3298	0.18	2742	3.01	556	3.11	-0.105	(-0.57)
Hispanic	3298	0.27	2742	3.61	556	4.27	-0.658*	(-2.41)
Color	3298	1.14	2742	30.96	556	28.00	2.960**	(2.59)
White (1990)	3298	1.11	2742	74.32	556	79.09	-4.776***	(-4.30)
Black	3298	1.07	2742	23.36	556	18.91	4.454***	(4.15)
Asian	3298	0.07	2742	0.67	556	0.81	-0.145*	(-2.07)
Native American	3298	0.11	2742	0.95	556	0.36	0.586***	(5.18)
Others	3298	0.03	2742	0.36	556	0.27	0.0938**	(2.90)
Hispanic	3298	0.05	2742	0.95	556	0.78	0.165**	(3.10)
Color	3298	1.08	2742	25.85	556	20.85	5.005***	(4.63)

*p<0.05, **p<0.01, ***p<0.001

53. H. B. Robinson Steam Electric Plant, South Carolina

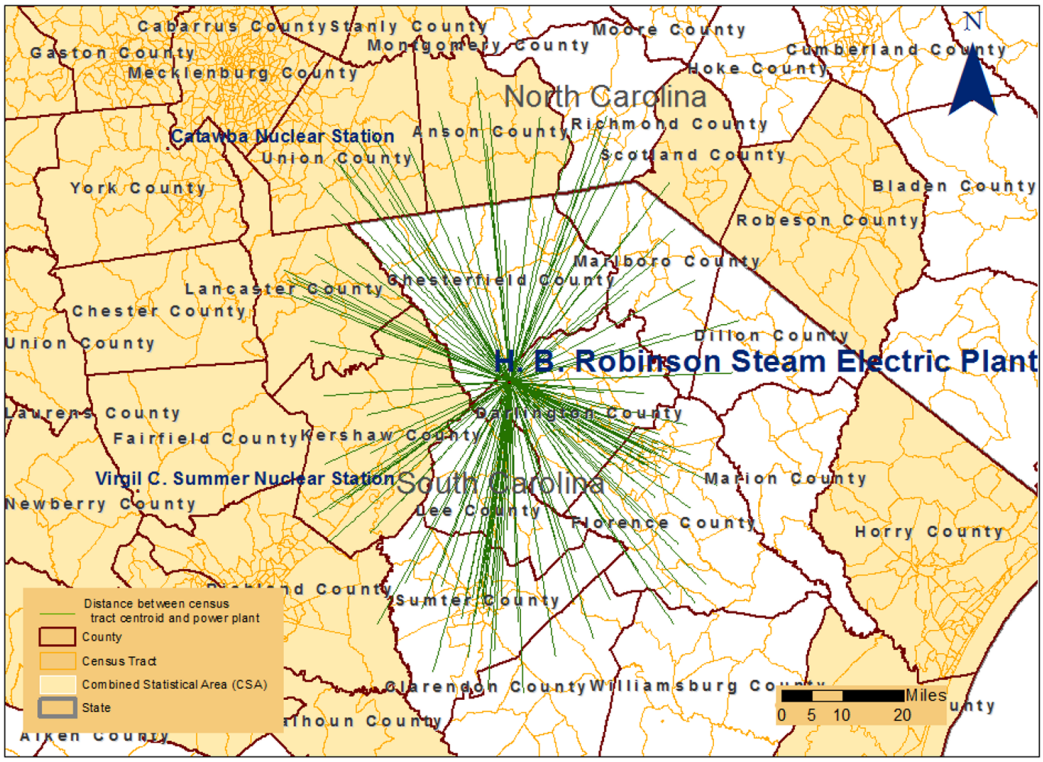

Figure B. 53 Distance to census-tract center points of census tracts within a 50-mile radius of H. B. Robinson Steam Electric Plant, South Carolina in 1990, 2000, and 2010

Table B. 105

Demographic Composition of Population, as sorted by Distance from H. B. Robinson Steam Electric Plant, South Carolina in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	8	16	38	55	35	152	3,146
Tract area (sq. mile)	309	1,060	1,346	2,225	1,423	6,363	79,477
Total population	30,342	53,517	142,372	207,559	134,251	568,041	9,547,261
White	20,650	30,268	82,578	128,638	85,691	347,825	7,071,098
Black	9,607	23,051	58,902	76,615	46,752	214,927	2,280,413
Asian	19	32	475	1,058	379	1,963	69,725
Native American	50	74	301	926	1,101	2,452	89,087
Others	16	93	114	308	341	872	36,949
Hispanic	77	239	459	1,126	971	2,872	94,476
Color	9,751	23,269	60,035	79,568	49,014	221,637	2,524,459
White (%)	68.06	56.56	58.00	61.98	63.83	61.23	74.06
Black (%)	31.66	43.07	41.37	36.91	34.82	37.84	23.89
Asian (%)	0.06	0.06	0.33	0.51	0.28	0.35	0.73
Native American (%)	0.16	0.14	0.21	0.45	0.82	0.43	0.93
Others (%)	0.05	0.17	0.08	0.15	0.25	0.15	0.39
Hispanic (%)	0.25	0.45	0.32	0.54	0.72	0.51	0.99
Color (%)	32.14	43.48	42.17	38.34	36.51	39.02	26.44
Female (%)	53.37	52.44	53.06	51.15	52.22	52.12	51.55
Old (65 + years) (%)	12.03	12.75	12.47	10.56	11.98	11.66	11.86
Kid (< 5 years) (%)	8.30	8.33	8.61	9.21	9.17	8.92	8.39
Native-born (%)	99.70	99.66	99.03	99.03	99.38	99.21	98.32
Renter housing units (%)	23.34	21.68	26.60	26.65	26.46	25.94	28.02
Education (%)	13.58	8.13	15.01	11.40	9.84	11.76	17.44
Unemployment (%)	5.10	6.86	6.03	6.62	5.92	6.24	4.99
Poverty (%)	17.68	22.42	19.66	18.52	18.18	19.05	13.49
Mean household income ($)	52,591	40,920	50,421	46,014	45,461	46,892	54,396
Year 2000							
Total population	32,295	59,414	155,000	222,116	147,285	616,110	11,445,215
White	21,100	32,655	86,903	130,786	89,174	360,618	8,137,225
Black	10,516	25,967	64,492	84,828	51,884	237,687	2,679,194
Asian	134	220	1,207	1,231	704	3,496	149,384
Native American	142	129	286	1,665	1,661	3,883	111,761
Others	403	442	2,112	3,593	3,875	10,425	367,652
Hispanic	410	554	1,980	2,879	6,002	11,825	453,967
Color	11,273	26,985	68,670	92,437	61,184	260,549	3,497,422
White (%)	65.34	54.96	56.07	58.88	60.55	58.53	71.10
Black (%)	32.56	43.71	41.61	38.19	35.23	38.58	23.41
Asian (%)	0.41	0.37	0.78	0.55	0.48	0.57	1.31
Native American (%)	0.44	0.22	0.18	0.75	1.13	0.63	0.98
Others (%)	1.25	0.74	1.36	1.62	2.63	1.69	3.21
Hispanic (%)	1.27	0.93	1.28	1.30	4.08	1.92	3.97
Color (%)	34.91	45.42	44.30	41.62	41.54	42.29	30.56
Female (%)	52.78	50.76	52.85	51.41	50.85	51.65	51.16
Old (65 + years) (%)	12.29	11.97	13.47	11.27	12.27	12.18	12.06
Kid (< 5 years) (%)	8.22	7.75	7.72	8.32	8.49	8.15	7.97
Native-born (%)	98.90	99.05	98.11	98.50	96.53	98.01	95.34
Renter housing units (%)	20.92	18.64	24.19	23.42	24.85	23.34	26.41
College degree or higher (%)	16.22	9.66	18.29	12.81	11.66	13.82	22.21
Unemployment (%)	10.49	7.47	7.06	6.93	7.63	7.37	5.40
Poverty (%)	19.68	20.70	17.16	15.39	17.52	17.08	12.66
Mean household income ($)	55,802	47,818	56,811	52,563	52,119	53,277	63,124
Year 2010							
Total population	33,936	60,353	164,994	234,292	156,145	649,720	13,132,886
White	22,259	33,581	91,837	135,359	93,029	376,065	9,111,662
Black	10,546	25,967	68,854	90,478	54,262	250,107	3,000,319
Asian	18	256	1,244	1,705	1,198	4,421	252,083
Native American	74	56	219	1,769	1,902	4,020	116,101
Others	1,039	493	2,840	4,981	5,754	15,107	652,721
Hispanic	1,036	423	3,384	7,564	11,051	23,458	908,704
Color	12,193	27,057	75,417	104,227	70,019	288,913	4,456,954
White (%)	65.59	55.64	55.66	57.77	59.58	57.88	69.38

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	31.08	43.03	41.73	38.62	34.75	38.49	22.85
Asian (%)	0.05	0.42	0.75	0.73	0.77	0.68	1.92
Native American (%)	0.22	0.09	0.13	0.76	1.22	0.62	0.88
Others (%)	3.06	0.82	1.72	2.13	3.69	2.33	4.97
Hispanic (%)	3.05	0.70	2.05	3.23	7.08	3.61	6.92
Color (%)	35.93	44.83	45.71	44.49	44.84	44.47	33.94
Female (%)	52.35	50.88	52.11	50.50	51.69	51.33	51.28
Old (65 + years) (%)	14.05	13.17	14.11	12.80	12.75	13.22	12.77
Kid (< 5 years) (%)	6.24	6.52	6.10	6.87	7.37	6.73	6.66
Native-born (%)	97.37	98.96	97.58	97.07	95.09	96.92	93.34
Renter housing units (%)	21.34	21.77	26.64	25.22	27.42	25.58	26.68
College degree or higher (%)	20.22	10.72	19.64	14.23	12.77	15.27	25.90
Unemployment (%)	11.16	13.17	9.92	11.16	12.20	11.26	8.81
Poverty (%)	17.00	23.35	19.87	19.16	21.49	20.18	15.60
Mean household income ($)	55,522	43,121	53,567	48,269	48,010	49,510	61,393
Index	53	53	53	53	53	53	53

Table B. 106

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding H. B. Robinson Steam Electric Plant, South Carolina

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	3298	1.87	3146	68.25	152	56.64	11.61***	(6.22)
Black	3298	1.89	3146	23.11	152	39.30	-16.18***	(-8.56)
Asian	3298	0.10	3146	1.87	152	0.61	1.266***	(12.43)
Native American	3298	0.16	3146	0.86	152	0.55	0.302	(1.91)
Others	3298	0.24	3146	4.70	152	2.25	2.452***	(10.24)
Hispanic	3298	0.47	3146	6.54	152	3.40	3.137***	(6.73)
Color	3298	1.84	3146	33.69	152	44.94	-11.25***	(-6.13)
White (2000)	3298	1.84	3146	71.60	152	57.75	13.85***	(7.53)
Black	3298	1.88	3146	22.88	152	39.50	-16.62***	(-8.83)
Asian	3298	0.08	3146	1.34	152	0.56	0.782***	(9.93)
Native American	3298	0.14	3146	0.94	152	0.57	0.371**	(2.62)
Others	3298	0.16	3146	3.09	152	1.63	1.468***	(8.94)
Hispanic	3298	0.33	3146	3.81	152	1.88	1.938***	(5.95)
Color	3298	1.83	3146	29.86	152	43.03	-13.17***	(-7.19)
White (1990)	3298	1.95	3146	75.78	152	61.57	14.20***	(7.29)
Black	3298	1.92	3146	21.92	152	36.86	-14.94***	(-7.77)
Asian	3298	0.05	3146	0.71	152	0.32	0.397***	(7.73)
Native American	3298	0.12	3146	0.87	152	0.38	0.493***	(3.98)
Others	3298	0.03	3146	0.35	152	0.13	0.223***	(7.06)
Hispanic	3298	0.06	3146	0.94	152	0.46	0.481***	(8.46)
Color	3298	1.91	3146	24.38	152	38.00	-13.62***	(-7.12)

*p<0.05, **p<0.01, ***p<0.001

54. Oconee Nuclear Station, South Carolina

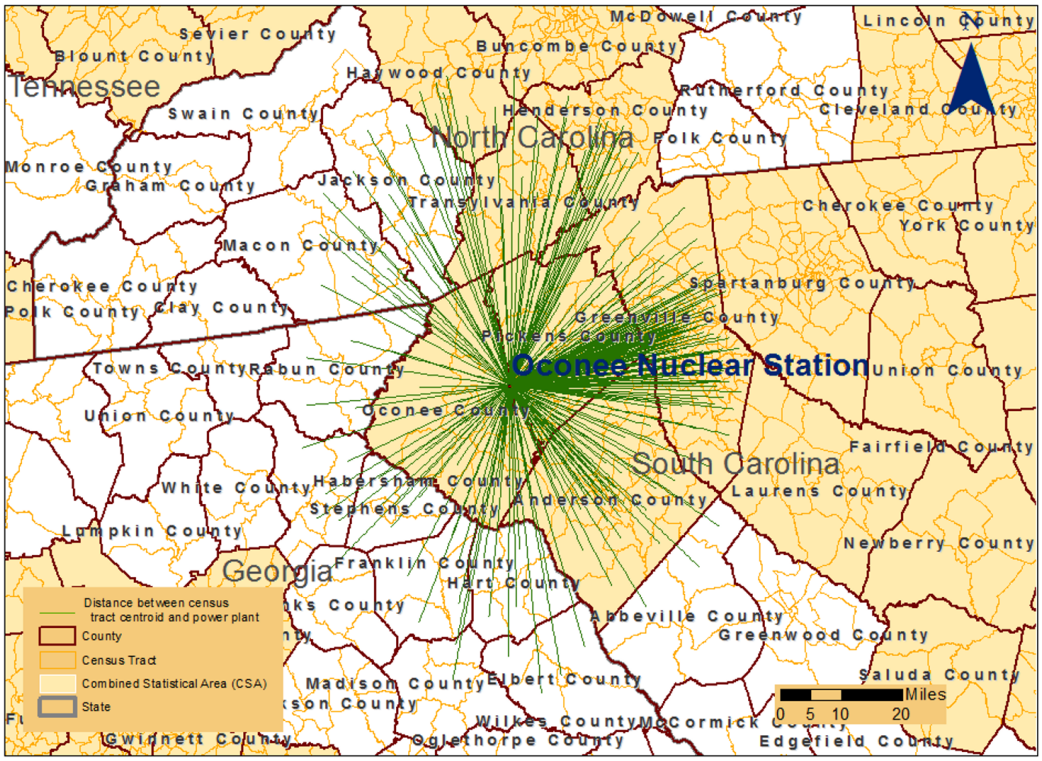

Figure B. 54 Distance to census-tract center points of census tracts within a 50-mile radius of Oconee Nuclear Station, South Carolina in 1990, 2000, and 2010

Table B. 107

Demographic Composition of Population, as sorted by Distance from Oconee Nuclear Station, South Carolina in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	15	29	103	91	38	276	4,991
Tract area (sq. mile)	281	1,020	1,522	2,107	1,246	6,175	139,090
Total population	51,644	108,245	320,112	285,328	107,983	873,312	15,720,199
White	46,636	97,024	254,169	255,012	100,817	753,658	11,268,635
Black	4,251	10,517	63,798	27,548	6,182	112,296	4,127,916
Asian	600	320	910	1,852	371	4,053	141,391
Native American	98	217	531	594	440	1,880	104,941
Others	59	166	702	328	177	1,432	77,286
Hispanic	429	553	2,271	2,087	780	6,120	192,619
Color	5,375	11,609	67,316	31,991	7,707	123,998	4,550,561
White (%)	90.30	89.63	79.40	89.38	93.36	86.30	71.68
Black (%)	8.23	9.72	19.93	9.65	5.72	12.86	26.26
Asian (%)	1.16	0.30	0.28	0.65	0.34	0.46	0.90
Native American (%)	0.19	0.20	0.17	0.21	0.41	0.22	0.67
Others (%)	0.11	0.15	0.22	0.11	0.16	0.16	0.49
Hispanic (%)	0.83	0.51	0.71	0.73	0.72	0.70	1.23
Color (%)	10.41	10.72	21.03	11.21	7.14	14.20	28.95
Female (%)	49.79	51.22	52.65	51.24	52.17	51.79	51.54
Old (65 + years) (%)	12.44	12.23	14.21	12.55	19.85	14.02	10.99
Kid (< 5 years) (%)	6.85	7.42	8.12	7.96	6.60	7.72	8.76
Native-born (%)	97.51	99.26	98.95	98.17	98.53	98.59	97.93
Renter housing units (%)	28.97	19.39	27.90	22.67	18.98	24.08	29.58
Education (%)	22.72	12.49	14.31	20.70	16.20	16.92	18.03
Unemployment (%)	5.61	4.60	5.55	3.75	4.82	4.75	5.35
Poverty (%)	14.89	10.97	13.73	9.74	11.88	11.93	14.26
Mean household income ($)	50,519	51,741	50,654	58,351	49,849	53,158	56,668
Year 2000							
Total population	58,346	127,350	348,172	366,349	130,984	1,031,201	19,216,576
White	51,022	113,699	266,220	315,714	119,497	866,152	12,958,866
Black	4,744	11,143	70,882	37,340	7,169	131,278	5,127,713
Asian	1,107	492	2,382	4,898	419	9,298	318,911
Native American	105	238	738	696	710	2,487	136,845
Others	1,371	1,774	7,954	7,715	3,182	21,996	674,232
Hispanic	1,585	1,711	9,423	10,319	4,316	27,354	868,414
Color	8,081	14,385	86,578	55,909	13,588	178,541	6,636,156
White (%)	87.45	89.28	76.46	86.18	91.23	83.99	67.44
Black (%)	8.13	8.75	20.36	10.19	5.47	12.73	26.68
Asian (%)	1.90	0.39	0.68	1.34	0.32	0.90	1.66
Native American (%)	0.18	0.19	0.21	0.19	0.54	0.24	0.71
Others (%)	2.35	1.39	2.28	2.11	2.43	2.13	3.51
Hispanic (%)	2.72	1.34	2.71	2.82	3.30	2.65	4.52
Color (%)	13.85	11.30	24.87	15.26	10.37	17.31	34.53
Female (%)	49.60	50.69	52.03	50.97	51.73	51.31	51.04
Old (65 + years) (%)	12.95	13.22	14.07	13.02	20.02	14.29	10.91
Kid (< 5 years) (%)	6.71	7.36	7.82	7.76	6.65	7.53	8.30
Native-born (%)	95.46	98.28	96.94	95.80	96.35	96.54	94.34
Renter housing units (%)	28.12	18.37	26.02	22.09	18.42	22.85	27.89
College degree or higher (%)	25.55	16.81	17.60	25.26	21.04	21.12	22.88
Unemployment (%)	4.87	5.03	5.17	4.58	4.87	4.88	5.53
Poverty (%)	16.79	10.82	13.67	9.33	11.28	11.65	13.00
Mean household income ($)	55,769	56,897	57,906	67,407	57,481	60,951	66,003
Year 2010							
Total population	64,579	136,681	371,175	436,380	144,005	1,152,820	22,098,600
White	56,070	122,318	283,428	367,066	127,670	956,552	14,319,430
Black	5,311	10,358	72,758	46,137	7,615	142,179	5,981,316
Asian	1,410	668	2,775	8,699	811	14,363	543,977
Native American	131	290	597	842	1,100	2,960	140,395
Others	1,657	3,047	11,617	13,636	6,809	36,766	1,113,483
Hispanic	3,001	3,088	22,851	24,853	8,473	62,266	1,654,608
Color	10,590	16,167	104,261	86,084	19,392	236,494	8,596,418
White (%)	86.82	89.49	76.36	84.12	88.66	82.97	64.80

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	8.22	7.58	19.60	10.57	5.29	12.33	27.07
Asian (%)	2.18	0.49	0.75	1.99	0.56	1.25	2.46
Native American (%)	0.20	0.21	0.16	0.19	0.76	0.26	0.64
Others (%)	2.57	2.23	3.13	3.12	4.73	3.19	5.04
Hispanic (%)	4.65	2.26	6.16	5.70	5.88	5.40	7.49
Color (%)	16.40	11.83	28.09	19.73	13.47	20.51	38.90
Female (%)	49.62	50.71	51.91	51.33	51.29	51.34	51.21
Old (65 + years) (%)	14.53	15.07	14.77	13.97	21.05	15.28	11.58
Kid (< 5 years) (%)	5.12	5.60	6.78	6.37	4.92	6.16	6.95
Native-born (%)	93.72	97.83	94.53	93.46	94.47	94.46	92.12
Renter housing units (%)	27.44	19.21	26.63	22.84	19.05	23.42	27.48
College degree or higher (%)	32.65	19.03	20.31	28.55	23.32	24.33	26.22
Unemployment (%)	9.11	9.79	9.75	7.23	7.83	8.51	8.91
Poverty (%)	19.64	15.27	18.60	12.48	14.99	15.49	15.79
Mean household income ($)	56,152	56,421	55,156	62,997	55,109	58,313	63,381
Index	54	54	54	54	54	54	54

Table B. 108

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Oconee Nuclear Station, South Carolina

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	5267	1.19	4991	63.84	276	81.07	-17.24***	(-14.46)
Black	5267	1.13	4991	27.50	276	14.03	13.47***	(11.92)
Asian	5267	0.14	4991	2.26	276	1.12	1.141***	(8.36)
Native American	5267	0.07	4991	0.64	276	0.27	0.377***	(5.76)
Others	5267	0.22	4991	4.73	276	3.15	1.590***	(7.20)
Hispanic	5267	0.40	4991	6.97	276	5.51	1.463***	(3.62)
Color	5267	1.24	4991	38.58	276	22.19	16.39***	(13.20)
White (2000)	5267	1.16	4991	67.87	276	82.84	-14.98***	(-12.88)
Black	5267	1.14	4991	26.41	276	13.91	12.50***	(10.93)
Asian	5267	0.09	4991	1.59	276	0.86	0.729***	(8.32)
Native American	5267	0.06	4991	0.71	276	0.25	0.466***	(7.59)
Others	5267	0.14	4991	3.33	276	2.15	1.183***	(8.60)
Hispanic	5267	0.22	4991	4.26	276	2.68	1.578***	(7.03)
Color	5267	1.18	4991	33.87	276	18.46	15.41***	(13.09)
White (1990)	5267	1.10	4991	73.61	276	86.65	-13.04***	(-11.83)
Black	5267	1.10	4991	24.18	276	12.54	11.64***	(10.54)
Asian	5267	0.05	4991	0.86	276	0.42	0.436***	(7.99)
Native American	5267	0.07	4991	0.65	276	0.22	0.425***	(6.54)
Others	5267	0.03	4991	0.46	276	0.17	0.286***	(9.66)
Hispanic	5267	0.06	4991	1.18	276	0.69	0.488***	(8.63)
Color	5267	1.10	4991	26.78	276	13.83	12.94***	(11.77)

*p<0.05, **p<0.01, ***p<0.001

55. Virgil C. Summer Nuclear Station, South Carolina

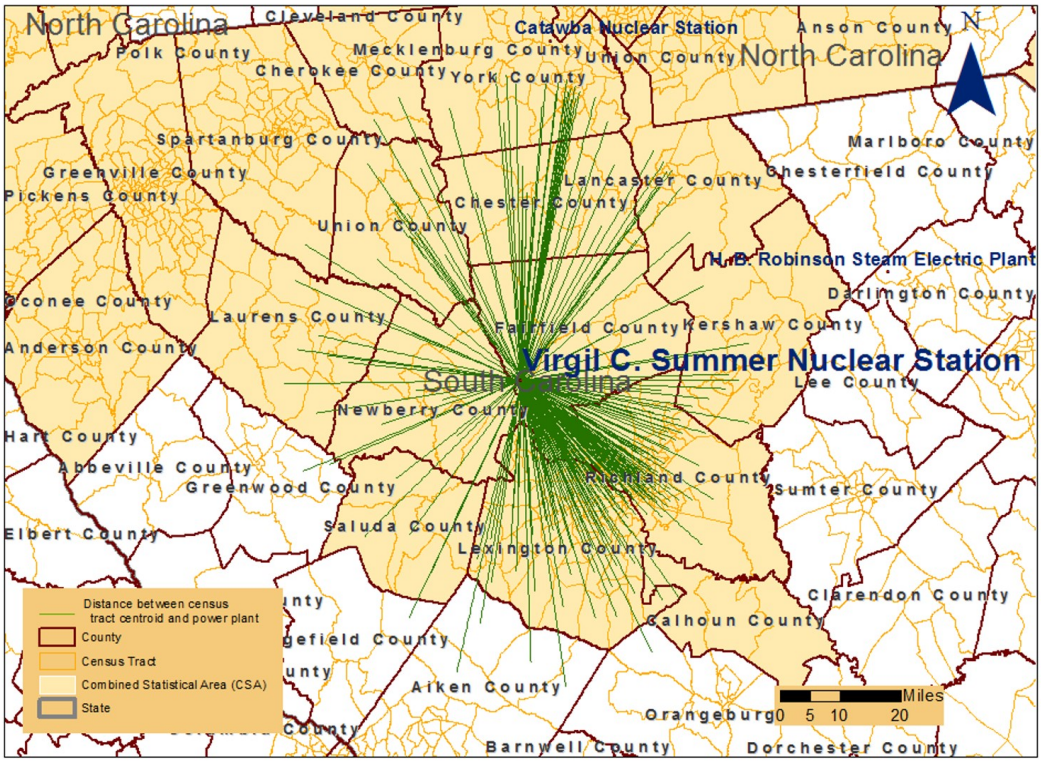

Figure B. 55 Distance to census-tract center points of census tracts within a 50-mile radius of Virgil C. Summer Nuclear Station, South Carolina in 1990, 2000, and 2010

Table B. 109

Demographic Composition of Population, as sorted by Distance from Virgil C. Summer Nuclear Station, South Carolina in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	5	29	116	64	37	251	852
Tract area (sq. mile)	457	827	1,380	2,295	1,477	6,436	25,584
Total population	14,256	93,431	326,936	195,017	119,756	749,396	2,737,290
White	7,775	71,777	212,349	132,565	76,637	501,103	1,906,577
Black	6,450	20,912	109,418	59,903	42,319	239,002	800,999
Asian	20	494	3,257	1,012	229	5,012	16,285
Native American	2	78	647	565	495	1,787	7,146
Others	11	166	1,257	988	66	2,488	6,288
Hispanic	38	500	3,443	2,260	421	6,662	21,668
Color	6,499	21,954	116,377	63,301	43,391	251,522	843,251
White (%)	54.54	76.82	64.95	67.98	63.99	66.87	69.65
Black (%)	45.24	22.38	33.47	30.72	35.34	31.89	29.26
Asian (%)	0.14	0.53	1.00	0.52	0.19	0.67	0.59
Native American (%)	0.01	0.08	0.20	0.29	0.41	0.24	0.26
Others (%)	0.08	0.18	0.38	0.51	0.06	0.33	0.23
Hispanic (%)	0.27	0.54	1.05	1.16	0.35	0.89	0.79
Color (%)	45.59	23.50	35.60	32.46	36.23	33.56	30.81
Female (%)	51.34	51.47	51.91	51.46	52.07	51.75	51.61
Old (65 + years) (%)	11.39	10.27	10.51	10.65	11.15	10.63	11.56
Kid (< 5 years) (%)	7.93	8.90	8.13	8.52	9.07	8.47	8.88
Native-born (%)	99.71	98.87	97.62	98.66	99.46	98.38	98.62
Renter housing units (%)	11.61	18.67	34.93	22.68	24.67	27.80	26.32
Education (%)	13.47	26.78	24.72	12.99	9.87	19.45	15.88
Unemployment (%)	5.11	4.29	5.16	5.44	6.52	5.33	5.65
Poverty (%)	14.75	9.72	12.90	13.55	16.32	13.25	15.94
Mean household income ($)	52,998	66,688	56,992	50,938	48,823	55,365	52,202
Year 2000							
Total population	18,174	113,750	372,457	222,318	138,851	865,550	3,146,462
White	10,930	82,464	228,113	145,827	89,405	556,739	2,138,939
Black	7,087	28,061	129,336	68,664	46,769	279,917	902,810
Asian	58	1,078	5,618	1,669	415	8,838	29,051
Native American	22	341	1,357	778	518	3,016	11,672
Others	85	1,798	8,014	5,406	1,729	17,032	63,998
Hispanic	177	2,630	9,060	5,948	1,928	19,743	73,085
Color	7,324	32,759	148,317	78,743	50,306	317,449	1,040,162
White (%)	60.14	72.50	61.25	65.59	64.39	64.32	67.98
Black (%)	39.00	24.67	34.73	30.89	33.68	32.34	28.69
Asian (%)	0.32	0.95	1.51	0.75	0.30	1.02	0.92
Native American (%)	0.12	0.30	0.36	0.35	0.37	0.35	0.37
Others (%)	0.47	1.58	2.15	2.43	1.25	1.97	2.03
Hispanic (%)	0.97	2.31	2.43	2.68	1.39	2.28	2.32
Color (%)	40.30	28.80	39.82	35.42	36.23	36.68	33.06
Female (%)	51.28	51.82	51.96	51.38	51.92	51.77	51.38
Old (65 + years) (%)	10.69	10.89	11.04	11.24	10.48	10.97	12.42
Kid (< 5 years) (%)	8.23	7.95	7.51	8.04	8.32	7.85	7.90
Native-born (%)	99.03	96.81	96.37	97.52	98.70	97.15	97.10
Renter housing units (%)	8.77	18.17	32.90	21.69	23.00	26.10	23.84
College degree or higher (%)	21.91	31.82	28.82	14.65	11.92	22.83	19.76
Unemployment (%)	3.11	4.47	6.13	6.09	7.62	6.07	5.79
Poverty (%)	11.29	9.64	13.29	13.29	14.09	12.88	14.44
Mean household income ($)	65,454	74,481	64,127	55,401	55,276	61,971	59,765
Year 2010							
Total population	22,287	126,697	436,932	233,924	151,179	971,019	3,540,409
White	14,494	88,230	256,755	152,389	96,958	608,826	2,425,174
Black	7,260	32,158	156,161	71,933	48,484	315,996	953,488
Asian	115	1,155	9,088	2,249	811	13,418	42,923
Native American	37	118	808	1,211	495	2,669	11,426
Others	381	5,036	14,120	6,142	4,431	30,110	107,398
Hispanic	143	4,940	21,071	9,788	5,756	41,698	167,056
Color	7,888	40,699	192,459	87,465	57,621	386,132	1,217,621
White (%)	65.03	69.64	58.76	65.14	64.13	62.70	68.50

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	32.58	25.38	35.74	30.75	32.07	32.54	26.93
Asian (%)	0.52	0.91	2.08	0.96	0.54	1.38	1.21
Native American (%)	0.17	0.09	0.18	0.52	0.33	0.27	0.32
Others (%)	1.71	3.97	3.23	2.63	2.93	3.10	3.03
Hispanic (%)	0.64	3.90	4.82	4.18	3.81	4.29	4.72
Color (%)	35.39	32.12	44.05	37.39	38.11	39.77	34.39
Female (%)	52.11	51.75	51.25	50.92	50.98	51.22	51.36
Old (65 + years) (%)	12.46	12.33	10.90	12.79	11.60	11.69	13.61
Kid (< 5 years) (%)	5.96	6.61	6.24	6.99	6.98	6.58	6.55
Native-born (%)	98.58	96.06	94.52	96.37	97.07	95.66	95.20
Renter housing units (%)	12.15	20.04	32.53	23.80	25.19	27.17	24.59
College degree or higher (%)	30.39	34.70	32.25	18.44	14.99	26.49	23.28
Unemployment (%)	5.38	6.67	8.07	10.15	12.38	8.95	9.34
Poverty (%)	12.28	10.39	14.05	17.49	18.67	15.10	16.75
Mean household income ($)	68,719	73,422	61,786	53,274	50,067	59,643	58,749
Index	55	55	55	55	55	55	55

Table B. 110

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Virgil C. Summer Nuclear Station, South Carolina

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	1103	1.89	852	66.70	251	62.20	4.499*	(2.39)
Black	1103	1.85	852	27.59	251	32.61	-5.015**	(-2.71)
Asian	1103	0.15	852	1.14	251	1.35	-0.205	(-1.34)
Native American	1103	0.05	852	0.31	251	0.28	0.0266	(0.50)
Others	1103	0.24	852	2.85	251	2.77	0.0834	(0.35)
Hispanic	1103	0.39	852	4.53	251	3.92	0.606	(1.54)
Color	1103	1.85	852	34.72	251	39.32	-4.596*	(-2.49)
White (2000)	1103	1.79	852	68.37	251	65.08	3.284	(1.83)
Black	1103	1.80	852	28.29	251	31.67	-3.381	(-1.88)
Asian	1103	0.10	852	0.93	251	1.03	-0.106	(-1.01)
Native American	1103	0.05	852	0.40	251	0.33	0.0677	(1.35)
Others	1103	0.14	852	2.06	251	1.88	0.185	(1.31)
Hispanic	1103	0.19	852	2.37	251	2.15	0.214	(1.12)
Color	1103	1.79	852	32.70	251	35.86	-3.157	(-1.77)
White (1990)	1103	1.79	852	71.08	251	70.16	0.928	(0.52)
Black	1103	1.79	852	27.36	251	28.68	-1.315	(-0.74)
Asian	1103	0.08	852	0.57	251	0.63	-0.0601	(-0.76)
Native American	1103	0.03	852	0.25	251	0.24	0.0019	(0.06)
Others	1103	0.05	852	0.24	251	0.29	-0.0495	(-0.97)
Hispanic	1103	0.10	852	0.80	251	0.84	-0.0384	(-0.40)
Color	1103	1.77	852	28.92	251	30.28	-1.366	(-0.77)

*p<0.05, **p<0.01, ***p<0.001

56. Sequoyah Nuclear Plant, Tennessee

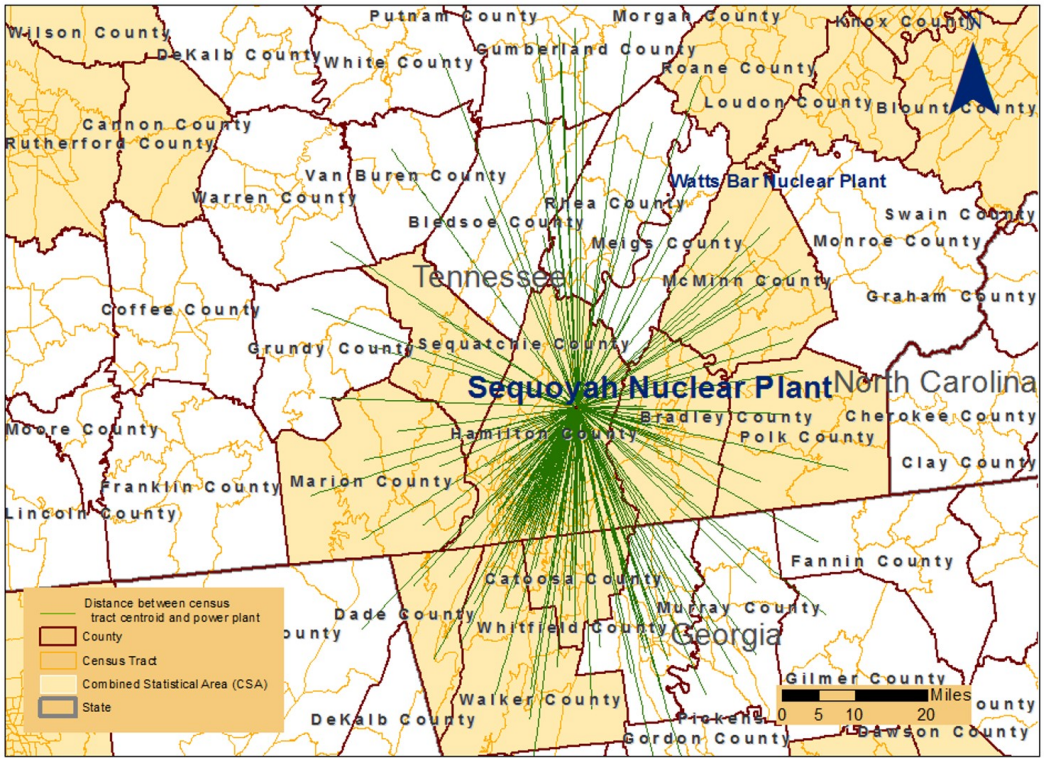

Figure B. 56 Distance to census-tract center points of census tracts within a 50-mile radius of Sequoyah Nuclear Plant, Tennessee in 1990, 2000, and 2010

Table B. 111

Demographic Composition of Population, as sorted by Distance from Sequoyah Nuclear Plant, Tennessee in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	20	84	41	42	18	205	4,442
Tract area (sq. mile)	312	830	1,704	2,070	1,311	6,227	147,763
Total population	76,278	292,438	165,308	155,698	57,971	747,693	14,648,283
White	74,365	239,110	154,592	147,359	56,638	672,064	10,954,868
Black	977	49,972	9,673	6,042	800	67,464	3,474,204
Asian	491	1,983	428	415	102	3,419	122,687
Native American	250	755	510	410	343	2,268	43,787
Others	181	634	96	1,469	93	2,473	52,731
Hispanic	442	2,011	713	2,481	255	5,902	150,147
Color	2,207	54,605	11,320	9,299	1,487	78,918	3,779,257
White (%)	97.49	81.76	93.52	94.64	97.70	89.89	74.79
Black (%)	1.28	17.09	5.85	3.88	1.38	9.02	23.72
Asian (%)	0.64	0.68	0.26	0.27	0.18	0.46	0.84
Native American (%)	0.33	0.26	0.31	0.26	0.59	0.30	0.30
Others (%)	0.24	0.22	0.06	0.94	0.16	0.33	0.36
Hispanic (%)	0.58	0.69	0.43	1.59	0.44	0.79	1.03
Color (%)	2.89	18.67	6.85	5.97	2.57	10.55	25.80
Female (%)	50.69	52.88	52.07	50.55	50.79	51.83	51.77
Old (65 + years) (%)	8.67	13.84	12.25	12.04	12.24	12.46	11.61
Kid (< 5 years) (%)	7.71	7.82	8.13	7.86	7.74	7.88	8.69
Native-born (%)	98.85	98.49	99.54	98.60	99.53	98.86	98.18
Renter housing units (%)	18.23	34.24	23.17	24.80	15.65	26.95	29.60
Education (%)	18.19	17.53	8.70	9.58	7.66	13.26	17.49
Unemployment (%)	4.58	5.79	6.12	6.37	5.92	5.86	6.25
Poverty (%)	7.39	14.59	15.63	14.96	13.88	14.10	16.05
Mean household income ($)	65,651	52,404	46,665	48,602	46,180	51,188	55,264
Year 2000							
Total population	90,338	322,102	191,921	177,853	73,129	855,343	17,467,492
White	85,955	252,461	177,250	158,606	69,645	743,917	12,307,383
Black	2,147	57,830	9,594	6,063	974	76,608	4,348,410
Asian	789	3,779	869	997	284	6,718	255,997
Native American	288	860	565	488	228	2,429	59,697
Others	1,138	7,201	3,633	11,691	2,008	25,671	496,006
Hispanic	1,250	6,293	3,485	18,300	2,084	31,412	590,616
Color	5,121	72,418	16,199	26,746	4,112	124,596	5,432,851
White (%)	95.15	78.38	92.36	89.18	95.24	86.97	70.46
Black (%)	2.38	17.95	5.00	3.41	1.33	8.96	24.89
Asian (%)	0.87	1.17	0.45	0.56	0.39	0.79	1.47
Native American (%)	0.32	0.27	0.29	0.27	0.31	0.28	0.34
Others (%)	1.26	2.24	1.89	6.57	2.75	3.00	2.84
Hispanic (%)	1.38	1.95	1.82	10.29	2.85	3.67	3.38
Color (%)	5.67	22.48	8.44	15.04	5.62	14.57	31.10
Female (%)	50.89	52.14	51.34	50.18	49.98	51.23	51.24
Old (65 + years) (%)	10.60	13.89	12.53	12.37	12.23	12.78	11.23
Kid (< 5 years) (%)	7.50	7.41	8.06	8.41	7.87	7.81	8.29
Native-born (%)	97.65	97.06	98.29	92.23	97.67	96.45	95.46
Renter housing units (%)	17.20	33.66	21.95	24.24	15.37	25.92	27.76
College degree or higher (%)	22.05	21.29	11.39	10.58	8.55	15.87	21.80
Unemployment (%)	3.32	5.85	4.67	4.72	4.17	4.94	5.68
Poverty (%)	6.30	13.48	12.72	14.49	12.62	12.67	13.96
Mean household income ($)	74,061	59,963	56,218	52,671	54,467	58,659	64,327
Year 2010							
Total population	104,716	344,451	213,882	195,827	78,444	937,320	19,479,114
White	97,329	263,853	194,285	171,839	73,885	801,191	13,191,726
Black	4,396	62,369	10,116	5,896	1,375	84,152	5,058,618
Asian	1,640	5,411	1,590	1,299	70	10,010	435,058
Native American	250	1,000	692	660	295	2,897	61,388
Others	1,101	11,818	7,199	16,133	2,819	39,070	732,324
Hispanic	1,489	16,626	9,764	29,257	4,034	61,170	1,147,361
Color	8,510	90,122	25,491	40,313	7,284	171,720	6,923,635
White (%)	92.95	76.60	90.84	87.75	94.19	85.48	67.72

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	4.20	18.11	4.73	3.01	1.75	8.98	25.97
Asian (%)	1.57	1.57	0.74	0.66	0.09	1.07	2.23
Native American (%)	0.24	0.29	0.32	0.34	0.38	0.31	0.32
Others (%)	1.05	3.43	3.37	8.24	3.59	4.17	3.76
Hispanic (%)	1.42	4.83	4.57	14.94	5.14	6.53	5.89
Color (%)	8.13	26.16	11.92	20.59	9.29	18.32	35.54
Female (%)	51.47	51.77	51.16	50.31	49.15	51.07	51.26
Old (65 + years) (%)	13.67	14.40	13.89	13.23	14.30	13.95	11.76
Kid (< 5 years) (%)	5.59	6.24	6.47	6.87	5.73	6.31	6.86
Native-born (%)	97.50	95.17	96.97	90.76	96.17	95.00	93.36
Renter housing units (%)	18.13	32.94	23.28	23.30	16.56	25.80	26.98
College degree or higher (%)	26.17	23.80	14.61	13.03	9.30	18.55	24.82
Unemployment (%)	6.70	9.30	9.79	9.75	9.33	9.18	8.72
Poverty (%)	7.72	17.23	16.73	19.33	15.61	16.33	16.27
Mean household income ($)	74,655	56,716	52,512	50,189	48,170	55,772	62,483
Index	56	56	56	56	56	56	56

Table B. 112

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Sequoyah Nuclear Plant, Tennessee

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	4647	1.60	4442	65.83	205	83.38	-17.56***	(-10.97)
Black	4647	1.48	4442	27.75	205	10.74	17.01***	-11.51
Asian	4647	0.14	4442	1.95	205	0.99	0.961***	-7.01
Native American	4647	0.05	4442	0.32	205	0.32	-0.00175	(-0.04)
Others	4647	0.37	4442	3.45	205	4.08	-0.628	(-1.69)
Hispanic	4647	0.76	4442	5.35	205	6.09	-0.748	(-0.98)
Color	4647	1.67	4442	36.46	205	19.60	16.86***	-10.12
White (2000)	4647	1.56	4442	69.88	205	85.59	-15.72***	(-10.09)
Black	4647	1.51	4442	25.68	205	10.45	15.24***	-10.11
Asian	4647	0.09	4442	1.35	205	0.79	0.554***	-6.17
Native American	4647	0.03	4442	0.34	205	0.27	0.0721**	-2.76
Others	4647	0.34	4442	2.69	205	2.90	-0.212	(-0.61)
Hispanic	4647	0.57	4442	3.12	205	3.44	-0.321	(-0.56)
Color	4647	1.61	4442	31.47	205	15.82	15.64***	-9.72
White (1990)	4647	1.44	4442	76.24	205	89.66	-13.43***	(-9.34)
Black	4647	1.44	4442	22.24	205	9.22	13.02***	-9.06
Asian	4647	0.06	4442	0.80	205	0.45	0.348***	-6.21
Native American	4647	0.04	4442	0.30	205	0.32	-0.0186	(-0.52)
Others	4647	0.10	4442	0.35	205	0.34	0.00789	-0.08
Hispanic	4647	0.12	4442	1.02	205	0.81	0.215	-1.76
Color	4647	1.43	4442	24.29	205	10.78	13.51***	-9.42

*p<0.05, **p<0.01, ***p<0.001

57. Watts Bar Nuclear Plant, Tennessee

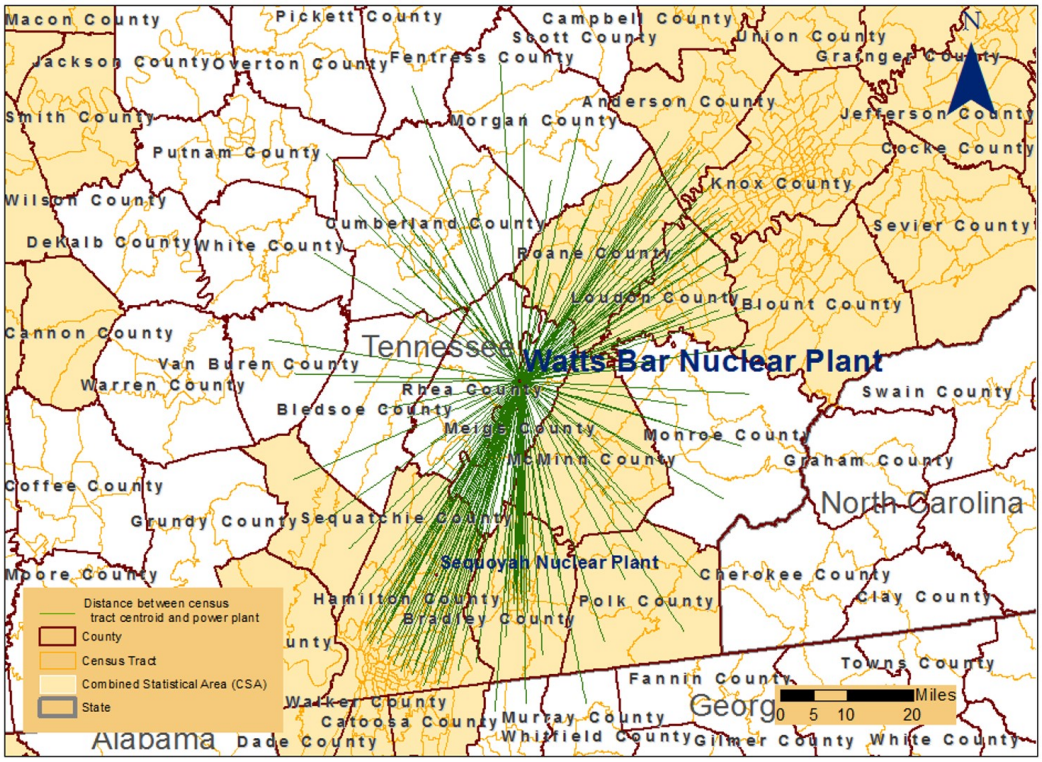

Figure B. 57 Distance to census-tract center points of census tracts within a 50-mile radius of Watts Bar Nuclear Plant, Tennessee in 1990, 2000, and 2010

Table B. 113

Demographic Composition of Population, as sorted by Distance from Watts Bar Nuclear Plant, Tennessee in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	5	16	37	68	52	178	3,288
Tract area (sq. mile)	417	772	1,533	2,545	1,188	6,455	95,115
Total population	17,803	61,485	135,601	210,773	190,986	616,648	10,738,744
White	17,358	58,597	130,706	204,156	162,222	573,039	8,078,649
Black	348	2,431	4,030	4,538	25,951	37,298	2,484,619
Asian	21	114	179	998	1,827	3,139	101,213
Native American	41	210	495	687	561	1,994	25,762
Others	32	134	191	388	449	1,194	48,461
Hispanic	99	220	802	1,160	1,640	3,921	128,545
Color	527	2,993	5,514	7,412	29,899	46,345	2,731,038
White (%)	97.50	95.30	96.39	96.86	84.94	92.93	75.23
Black (%)	1.95	3.95	2.97	2.15	13.59	6.05	23.14
Asian (%)	0.12	0.19	0.13	0.47	0.96	0.51	0.94
Native American (%)	0.23	0.34	0.37	0.33	0.29	0.32	0.24
Others (%)	0.18	0.22	0.14	0.18	0.24	0.19	0.45
Hispanic (%)	0.56	0.36	0.59	0.55	0.86	0.64	1.20
Color (%)	2.96	4.87	4.07	3.52	15.66	7.52	25.43
Female (%)	50.29	52.15	51.09	50.91	52.34	51.50	51.67
Old (65 + years) (%)	12.42	14.66	13.91	11.52	13.18	12.90	11.09
Kid (< 5 years) (%)	6.41	7.48	7.27	7.77	7.76	7.59	8.81
Native-born (%)	99.43	99.53	99.38	98.99	98.17	98.89	97.90
Renter housing units (%)	15.80	22.71	20.52	20.82	28.32	23.18	30.92
Education (%)	6.29	10.84	10.33	14.24	21.23	14.99	18.02
Unemployment (%)	7.23	7.72	7.47	6.26	5.36	6.40	6.00
Poverty (%)	16.02	18.81	14.98	13.33	11.26	13.67	15.19
Mean household income ($)	43,804	43,813	47,294	54,053	58,609	52,697	57,100
Year 2000							
Total population	22,704	72,749	165,453	258,187	212,174	731,267	13,144,469
White	22,107	68,044	158,188	245,418	171,712	665,469	9,224,160
Black	323	2,868	3,782	5,971	32,436	45,380	3,226,594
Asian	9	272	686	1,516	3,024	5,507	226,113
Native American	71	233	444	681	755	2,184	37,045
Others	189	1,333	2,347	4,605	4,275	12,749	430,535
Hispanic	137	938	2,508	3,887	3,909	11,379	538,022
Color	644	5,116	8,852	14,852	42,370	71,834	4,165,552
White (%)	97.37	93.53	95.61	95.05	80.93	91.00	70.18
Black (%)	1.42	3.94	2.29	2.31	15.29	6.21	24.55
Asian (%)	0.04	0.37	0.41	0.59	1.43	0.75	1.72
Native American (%)	0.31	0.32	0.27	0.26	0.36	0.30	0.28
Others (%)	0.83	1.83	1.42	1.78	2.01	1.74	3.28
Hispanic (%)	0.60	1.29	1.52	1.51	1.84	1.56	4.09
Color (%)	2.84	7.03	5.35	5.75	19.97	9.82	31.69
Female (%)	50.72	51.56	50.91	50.51	52.19	51.20	51.06
Old (65 + years) (%)	12.39	13.99	15.68	12.38	14.28	13.84	10.57
Kid (< 5 years) (%)	8.04	7.45	6.94	7.44	7.27	7.30	8.41
Native-born (%)	99.46	98.82	98.40	98.15	96.89	97.95	94.51
Renter housing units (%)	15.75	21.95	19.01	20.28	28.15	22.32	29.20
College degree or higher (%)	8.63	10.85	13.89	18.84	24.46	18.22	22.56
Unemployment (%)	4.31	6.50	5.11	4.62	4.43	4.84	5.52
Poverty (%)	15.37	14.18	12.76	10.77	10.94	11.75	13.27
Mean household income ($)	49,660	51,163	56,858	62,857	65,471	60,696	66,652
Year 2010							
Total population	24,916	77,801	183,904	298,964	226,621	812,206	14,891,577
White	24,389	72,073	174,637	279,175	178,886	729,160	9,969,840
Black	191	3,168	4,182	9,915	36,386	53,842	3,856,603
Asian	0	522	1,045	3,276	4,772	9,615	382,465
Native American	101	135	376	872	614	2,098	36,373
Others	235	1,903	3,664	5,726	5,963	17,491	646,296
Hispanic	196	2,508	5,287	8,527	10,461	26,979	1,019,181
Color	712	7,387	12,975	25,893	55,226	102,193	5,469,325
White (%)	97.88	92.64	94.96	93.38	78.94	89.78	66.95

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	0.77	4.07	2.27	3.32	16.06	6.63	25.90
Asian (%)	0.00	0.67	0.57	1.10	2.11	1.18	2.57
Native American (%)	0.41	0.17	0.20	0.29	0.27	0.26	0.24
Others (%)	0.94	2.45	1.99	1.92	2.63	2.15	4.34
Hispanic (%)	0.79	3.22	2.87	2.85	4.62	3.32	6.84
Color (%)	2.86	9.49	7.06	8.66	24.37	12.58	36.73
Female (%)	51.03	52.15	49.95	50.72	51.83	51.00	51.19
Old (65 + years) (%)	15.04	15.54	18.69	14.46	15.62	15.86	11.13
Kid (< 5 years) (%)	4.96	6.27	5.00	6.26	5.54	5.73	7.02
Native-born (%)	99.28	97.26	97.58	96.96	94.87	96.62	92.24
Renter housing units (%)	20.19	21.88	19.57	20.88	28.02	22.71	27.97
College degree or higher (%)	9.74	13.80	16.17	22.12	27.14	20.95	25.63
Unemployment (%)	11.92	11.85	8.51	8.07	7.76	8.52	8.77
Poverty (%)	18.32	18.80	13.87	14.19	14.28	14.71	16.09
Mean household income ($)	48,760	47,342	54,341	62,930	62,752	59,019	63,819
Index	57	57	57	57	57	57	57

Table B. 114

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Watts Bar Nuclear Plant, Tennessee

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	3466	1.55	3288	65.90	178	88.28	-22.39***	(-14.41)
Black	3466	1.23	3288	26.80	178	6.54	20.26***	(16.50)
Asian	3466	0.17	3288	2.27	178	1.13	1.144***	(6.64)
Native American	3466	0.05	3288	0.25	178	0.26	-0.0146	(-0.29)
Others	3466	0.19	3288	4.02	178	2.10	1.919***	(10.31)
Hispanic	3466	0.34	3288	6.30	178	3.27	3.029***	(8.94)
Color	3466	1.34	3288	36.75	178	12.37	24.37***	(18.24)
White (2000)	3466	1.24	3288	70.14	178	90.83	-20.69***	(-16.65)
Black	3466	1.22	3288	24.79	178	6.33	18.47***	(15.13)
Asian	3466	0.10	3288	1.59	178	0.81	0.781***	(7.72)
Native American	3466	0.03	3288	0.29	178	0.30	-0.0122	(-0.41)
Others	3466	0.13	3288	3.11	178	1.75	1.362***	(10.77)
Hispanic	3466	0.16	3288	3.79	178	1.50	2.290***	(14.44)
Color	3466	1.24	3288	31.46	178	9.97	21.49***	(17.28)
White (1990)	3466	1.15	3288	76.98	178	93.45	-16.47***	(-14.37)
Black	3466	1.14	3288	21.35	178	5.51	15.84***	(13.91)
Asian	3466	0.08	3288	0.89	178	0.53	0.364***	(4.56)
Native American	3466	0.04	3288	0.25	178	0.33	-0.0763*	(-2.04)
Others	3466	0.04	3288	0.44	178	0.20	0.240***	(6.25)
Hispanic	3466	0.07	3288	1.19	178	0.66	0.526***	(7.88)
Color	3466	1.14	3288	23.60	178	7.02	16.59***	(14.51)

*p<0.05, **p<0.01, ***p<0.001

58. Comanche Peak Steam Electric Station, Texas

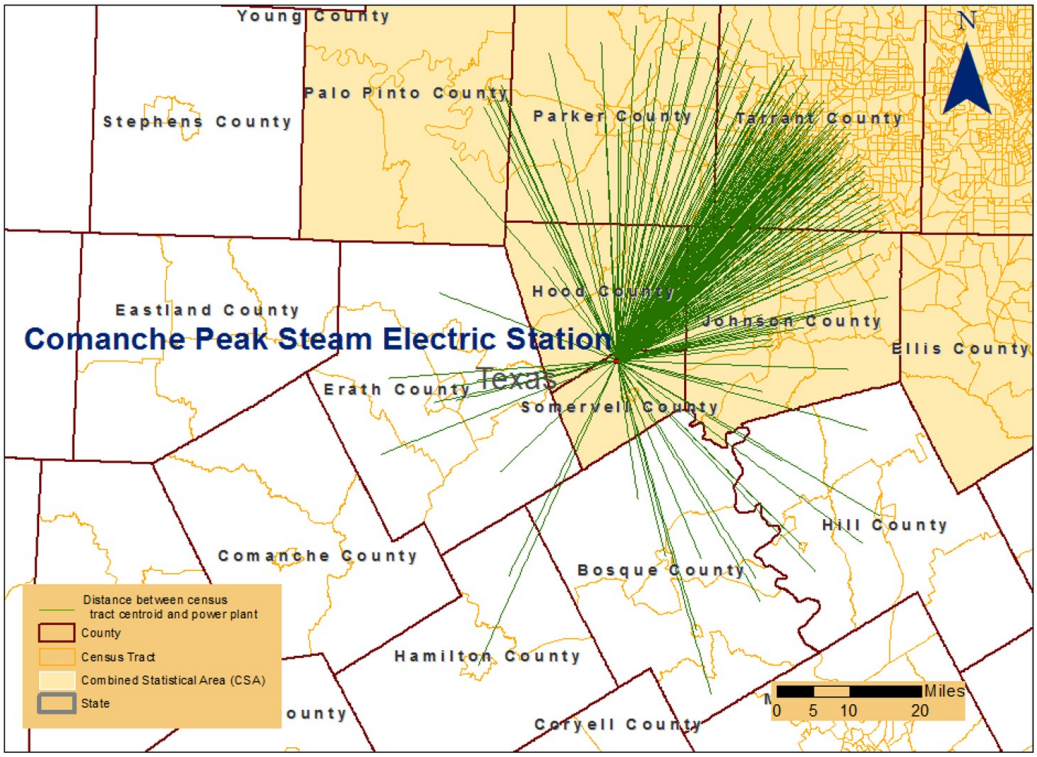

Figure B. 58 Distance to census-tract center points of census tracts within a 50-mile radius of Comanche Peak Steam Electric Station, Texas in 1990, 2000, and 2010

Table B. 115

Demographic Composition of Population, as sorted by Distance from Comanche Peak Steam Electric Station, Texas in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	6	10	28	120	104	268	4,997
Tract area (sq. mile)	356	1,003	1,427	2,308	992	6,086	262,510
Total population	16,383	27,568	87,665	413,835	336,153	881,604	16,104,907
White	15,526	26,606	81,737	335,381	232,870	692,120	12,095,405
Black	0	33	1,968	45,809	60,741	108,551	1,909,988
Asian	62	155	395	6,408	4,734	11,754	303,301
Native American	94	157	376	1,694	1,649	3,970	65,902
Others	703	615	3,197	24,539	36,153	65,207	1,730,315
Hispanic	1,275	1,614	6,661	44,466	59,795	113,811	4,180,319
Color	1,429	1,952	9,307	97,969	126,073	236,730	6,428,898
White (%)	94.77	96.51	93.24	81.04	69.28	78.51	75.10
Black (%)	0.00	0.12	2.24	11.07	18.07	12.31	11.86
Asian (%)	0.38	0.56	0.45	1.55	1.41	1.33	1.88
Native American (%)	0.57	0.57	0.43	0.41	0.49	0.45	0.41
Others (%)	4.29	2.23	3.65	5.93	10.75	7.40	10.74
Hispanic (%)	7.78	5.85	7.60	10.74	17.79	12.91	25.96
Color (%)	8.72	7.08	10.62	23.67	37.50	26.85	39.92
Female (%)	49.36	50.00	51.21	50.96	50.69	50.82	50.76
Old (65 + years) (%)	12.26	17.08	13.02	11.43	11.39	11.77	9.96
Kid (< 5 years) (%)	9.85	8.24	8.81	9.37	10.41	9.68	9.80
Native-born (%)	96.67	96.92	97.15	94.59	92.17	94.03	90.86
Renter housing units (%)	15.94	17.71	25.30	32.17	29.23	29.53	34.14
Education (%)	16.77	13.24	14.91	22.89	13.38	18.12	20.44
Unemployment (%)	10.40	8.64	6.78	5.70	8.55	7.02	7.12
Poverty (%)	11.08	12.02	14.33	11.57	18.42	14.46	18.30
Mean household income ($)	63,899	57,368	54,192	63,538	53,324	58,706	58,452
Year 2000							
Total population	23,844	36,129	108,363	486,385	395,470	1,050,191	19,801,628
White	22,535	33,701	98,149	367,184	267,745	789,314	14,008,671
Black	20	53	2,036	53,905	57,331	113,345	2,272,209
Asian	45	218	808	8,460	8,021	17,552	550,840
Native American	261	380	666	2,873	2,598	6,778	106,977
Others	985	1,773	6,715	53,973	59,748	123,194	2,862,940
Hispanic	2,005	3,146	12,939	89,719	109,199	217,008	6,453,114
Color	2,470	4,094	17,582	161,044	179,682	364,872	9,559,410
White (%)	94.51	93.28	90.57	75.49	67.70	75.16	70.75
Black (%)	0.08	0.15	1.88	11.08	14.50	10.79	11.47
Asian (%)	0.19	0.60	0.75	1.74	2.03	1.67	2.78
Native American (%)	1.09	1.05	0.61	0.59	0.66	0.65	0.54
Others (%)	4.13	4.91	6.20	11.10	15.11	11.73	14.46
Hispanic (%)	8.41	8.71	11.94	18.45	27.61	20.66	32.59
Color (%)	10.36	11.33	16.23	33.11	45.44	34.74	48.28
Female (%)	50.84	50.43	50.78	51.22	49.89	50.64	50.42
Old (65 + years) (%)	16.35	16.06	12.05	11.43	9.62	11.08	9.85
Kid (< 5 years) (%)	7.15	7.48	8.33	8.70	9.63	8.93	9.30
Native-born (%)	96.64	95.96	94.60	90.44	85.71	89.42	85.92
Renter housing units (%)	16.43	16.57	24.35	32.26	28.56	29.09	33.00
College degree or higher (%)	22.38	18.02	17.70	23.45	16.00	19.90	23.42
Unemployment (%)	4.47	4.89	6.61	4.60	6.28	5.43	6.10
Poverty (%)	6.77	10.67	10.36	11.26	15.81	12.75	15.51
Mean household income ($)	74,906	63,012	62,529	68,180	62,038	65,396	67,919
Year 2010							
Total population	28,892	42,708	130,604	568,750	449,146	1,220,100	23,091,792
White	25,938	38,570	119,408	436,281	304,710	924,907	16,578,539
Black	162	191	2,761	70,101	57,885	131,100	2,733,566
Asian	178	199	1,223	11,676	10,447	23,723	900,113
Native American	165	408	815	2,765	2,330	6,483	113,197
Others	2,449	3,340	6,397	47,927	73,774	133,887	2,766,376
Hispanic	3,517	4,793	20,293	138,056	149,222	315,881	8,601,596
Color	4,191	6,125	26,419	228,601	225,170	490,506	12,534,673
White (%)	89.78	90.31	91.43	76.71	67.84	75.81	71.79

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	0.56	0.45	2.11	12.33	12.89	10.75	11.84
Asian (%)	0.62	0.47	0.94	2.05	2.33	1.94	3.90
Native American (%)	0.57	0.96	0.62	0.49	0.52	0.53	0.49
Others (%)	8.48	7.82	4.90	8.43	16.43	10.97	11.98
Hispanic (%)	12.17	11.22	15.54	24.27	33.22	25.89	37.25
Color (%)	14.51	14.34	20.23	40.19	50.13	40.20	54.28
Female (%)	52.09	49.17	51.30	51.33	49.60	50.63	50.39
Old (65 + years) (%)	20.27	16.92	13.02	11.36	9.42	11.23	10.09
Kid (< 5 years) (%)	5.79	5.74	7.23	7.51	8.28	7.66	7.84
Native-born (%)	94.20	94.96	93.75	87.65	84.28	87.47	83.71
Renter housing units (%)	17.45	18.80	24.59	30.32	27.61	27.95	31.05
College degree or higher (%)	28.15	20.40	19.56	25.62	18.57	22.30	25.95
Unemployment (%)	3.91	5.48	6.92	7.18	8.82	7.62	6.97
Poverty (%)	8.36	13.33	13.26	14.27	17.57	15.20	16.84
Mean household income ($)	75,416	71,102	67,592	68,754	62,768	66,798	68,801
Index	58	58	58	58	58	58	58

Table B. 116

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Comanche Peak Steam Electric Station, Texas

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	5265	1.33	4997	71.58	268	74.80	-3.225*	(-2.43)
Black	5265	1.11	4997	11.93	268	11.74	0.191	-0.17
Asian	5265	0.19	4997	3.53	268	1.78	1.745***	-9.21
Native American	5265	0.06	4997	0.50	268	0.56	-0.0591	(-1.06)
Others	5265	0.75	4997	11.65	268	11.12	0.529	-0.7
Hispanic	5265	1.43	4997	36.25	268	26.46	9.787***	-6.85
Color	5265	1.82	4997	52.97	268	41.57	11.39***	-6.26
White (2000)	5265	1.46	4997	71.46	268	75.02	-3.560*	(-2.44)
Black	5265	1.27	4997	11.36	268	11.50	-0.135	(-0.11)
Asian	5265	0.16	4997	2.67	268	1.70	0.976***	-6.22
Native American	5265	0.05	4997	0.55	268	0.63	-0.0836	(-1.84)
Others	5265	0.69	4997	13.87	268	11.13	2.736***	-3.95
Hispanic	5265	1.31	4997	31.08	268	19.67	11.41***	-8.7
Color	5265	1.80	4997	46.54	268	34.49	12.05***	-6.69
White (1990)	5265	1.56	4997	76.63	268	79.79	-3.164*	(-2.03)
Black	5265	1.42	4997	10.83	268	11.79	-0.953	(-0.67)
Asian	5265	0.16	4997	1.80	268	1.31	0.495**	-3.16
Native American	5265	0.03	4997	0.43	268	0.47	-0.031	(-0.91)
Others	5265	0.68	4997	9.89	268	6.66	3.226***	-4.77
Hispanic	5265	1.02	4997	24.28	268	11.84	12.44***	-12.19
Color	5265	1.70	4997	37.19	268	25.25	11.94***	-7.04

*p<0.05, **p<0.01, ***p<0.001

59. South Texas Project, Texas

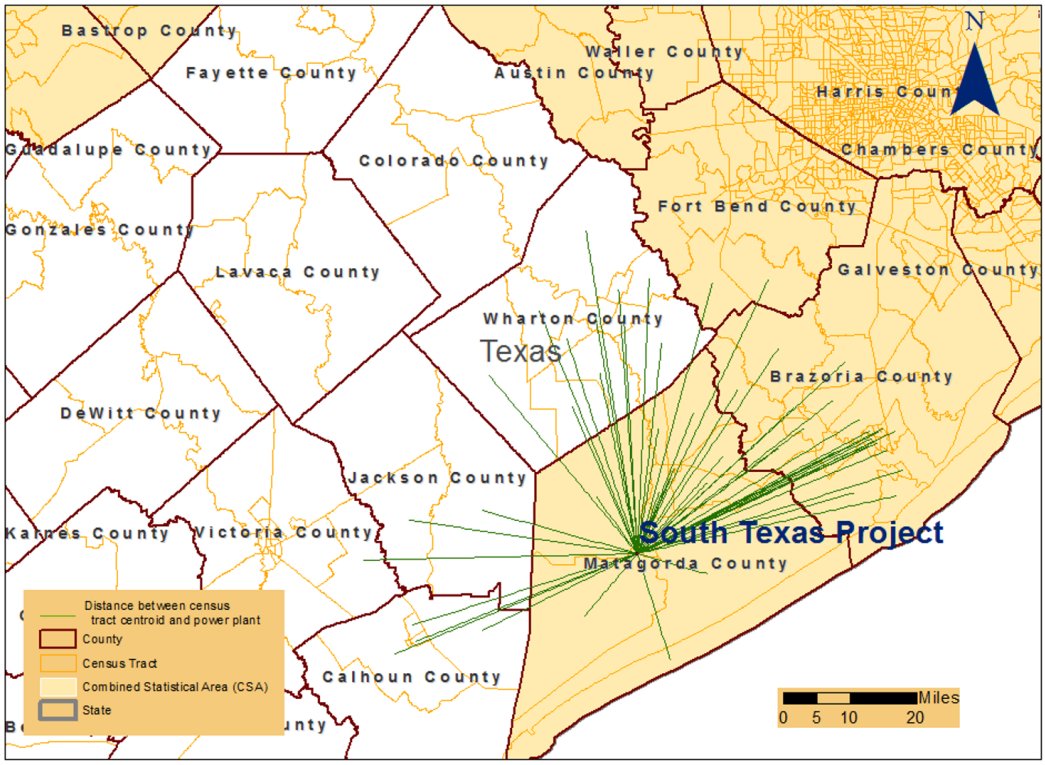

Figure B. 59 Distance to census-tract center points of census tracts within a 50-mile radius of South Texas Project, Texas in 1990, 2000, and 2010

Table B. 117

Demographic Composition of Population, as sorted by Distance from South Texas Project, Texas in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	1	9	7	23	12	52	5,213
Tract area (sq. mile)	25	1,484	1,003	1,428	725	4,663	263,933
Total population	3,233	25,996	28,373	98,056	43,455	199,113	16,787,398
White	1,171	19,716	22,227	77,477	32,043	152,634	12,634,891
Black	1,783	2,641	2,999	9,481	5,330	22,234	1,996,305
Asian	16	596	117	901	262	1,892	313,163
Native American	8	83	51	268	176	586	69,286
Others	251	2,967	2,977	9,932	5,646	21,773	1,773,749
Hispanic	347	6,735	6,038	21,018	9,892	44,030	4,250,100
Color	2,140	9,990	9,198	31,624	15,645	68,597	6,597,031
White (%)	36.22	75.84	78.34	79.01	73.74	76.66	75.26
Black (%)	55.15	10.16	10.57	9.67	12.27	11.17	11.89
Asian (%)	0.49	2.29	0.41	0.92	0.60	0.95	1.87
Native American (%)	0.25	0.32	0.18	0.27	0.41	0.29	0.41
Others (%)	7.76	11.41	10.49	10.13	12.99	10.93	10.57
Hispanic (%)	10.73	25.91	21.28	21.43	22.76	22.11	25.32
Color (%)	66.19	38.43	32.42	32.25	36.00	34.45	39.30
Female (%)	52.77	50.06	50.94	49.42	49.97	49.89	50.78
Old (65 + years) (%)	14.57	11.30	12.60	10.74	9.72	10.92	10.05
Kid (< 5 years) (%)	9.90	10.39	9.42	9.73	10.49	9.94	9.79
Native-born (%)	97.03	94.66	95.98	95.97	94.21	95.43	90.97
Renter housing units (%)	29.45	23.79	22.79	27.00	27.57	26.04	33.99
Education (%)	13.40	12.41	10.02	15.17	14.14	13.82	20.40
Unemployment (%)	8.90	7.72	6.78	6.23	5.91	6.46	7.12
Poverty (%)	26.65	20.76	19.75	14.02	14.60	16.07	18.12
Mean household income ($)	46,372	52,637	50,393	59,729	59,121	57,074	58,481
Year 2000							
Total population	2,848	27,821	29,037	104,589	51,252	215,547	20,636,272
White	976	19,377	21,892	80,249	36,629	159,123	14,638,862
Black	1,489	2,718	2,655	9,230	5,561	21,653	2,363,901
Asian	0	867	123	1,372	482	2,844	565,548
Native American	7	122	210	442	173	954	112,801
Others	373	4,748	4,152	13,296	8,411	30,980	2,955,154
Hispanic	511	8,826	8,119	27,797	15,488	60,741	6,609,381
Color	2,049	12,727	11,180	39,626	22,160	87,742	9,836,540
White (%)	34.27	69.65	75.39	76.73	71.47	73.82	70.94
Black (%)	52.28	9.77	9.14	8.83	10.85	10.05	11.46
Asian (%)	0.00	3.12	0.42	1.31	0.94	1.32	2.74
Native American (%)	0.25	0.44	0.72	0.42	0.34	0.44	0.55
Others (%)	13.10	17.07	14.30	12.71	16.41	14.37	14.32
Hispanic (%)	17.94	31.72	27.96	26.58	30.22	28.18	32.03
Color (%)	71.95	45.75	38.50	37.89	43.24	40.71	47.67
Female (%)	49.33	50.17	50.56	49.76	50.32	50.05	50.44
Old (65 + years) (%)	16.22	12.76	12.78	11.96	9.74	11.70	9.90
Kid (< 5 years) (%)	7.09	9.19	8.31	8.78	9.50	8.92	9.29
Native-born (%)	94.98	89.36	93.70	93.14	90.63	92.16	86.03
Renter housing units (%)	27.52	24.47	22.17	24.85	28.60	25.29	32.89
College degree or higher (%)	12.51	12.96	9.90	16.89	15.46	15.04	23.32
Unemployment (%)	14.46	8.59	6.71	6.11	6.24	6.62	6.06
Poverty (%)	29.36	18.68	14.39	13.33	13.50	14.42	15.38
Mean household income ($)	47,534	52,902	55,810	64,295	62,168	60,886	67,862
Year 2010							
Total population	2,654	27,059	28,372	106,080	52,041	216,206	24,095,684
White	1,618	21,346	21,994	84,478	42,231	171,667	17,331,780
Black	843	2,935	2,658	9,621	4,945	21,002	2,843,664
Asian	9	754	306	1,450	306	2,825	921,011
Native American	0	50	127	299	136	612	119,068
Others	184	1,974	3,287	10,232	4,423	20,100	2,880,163
Hispanic	813	10,032	9,546	32,581	19,037	72,009	8,845,468
Color	1,802	13,972	12,872	45,184	24,634	98,464	12,926,715
White (%)	60.96	78.89	77.52	79.64	81.15	79.40	71.93

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	31.76	10.85	9.37	9.07	9.50	9.71	11.80
Asian (%)	0.34	2.79	1.08	1.37	0.59	1.31	3.82
Native American (%)	0.00	0.18	0.45	0.28	0.26	0.28	0.49
Others (%)	6.93	7.30	11.59	9.65	8.50	9.30	11.95
Hispanic (%)	30.63	37.07	33.65	30.71	36.58	33.31	36.71
Color (%)	67.90	51.64	45.37	42.59	47.34	45.54	53.65
Female (%)	54.60	49.15	50.10	50.08	51.48	50.36	50.40
Old (65 + years) (%)	14.81	13.72	14.12	12.78	12.13	12.94	10.12
Kid (< 5 years) (%)	13.07	7.24	6.67	6.97	8.37	7.38	7.83
Native-born (%)	96.16	88.19	92.07	92.31	89.77	91.20	83.84
Renter housing units (%)	26.20	19.80	19.66	23.85	25.16	23.00	30.97
College degree or higher (%)	22.02	14.14	13.02	17.47	15.92	16.13	25.85
Unemployment (%)	20.95	9.62	7.38	6.11	6.29	6.92	7.00
Poverty (%)	35.83	18.72	16.79	13.30	14.05	14.90	16.77
Mean household income ($)	58,182	57,343	63,317	65,116	61,833	62,983	68,751
Index	59	59	59	59	59	59	59

Table B. 118

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding South Texas Project, Texas

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	5265	2.03	5213	71.68	52	77.32	-5.640**	(-2.78)
Black	5265	1.39	5213	11.93	52	10.66	1.268	(0.91)
Asian	5265	0.41	5213	3.46	52	1.38	2.072***	(5.07)
Native American	5265	0.08	5213	0.50	52	0.28	0.227**	(2.83)
Others	5265	0.86	5213	11.66	52	8.43	3.229***	(3.77)
Hispanic	5265	2.30	5213	35.79	52	32.08	3.704	(1.61)
Color	5265	2.57	5213	52.46	52	45.23	7.232**	(2.81)
White (2000)	5265	1.79	5213	71.62	52	73.31	-1.691	(-0.95)
Black	5265	1.49	5213	11.38	52	10.78	0.593	(0.40)
Asian	5265	0.28	5213	2.64	52	1.10	1.543***	(5.60)
Native American	5265	0.06	5213	0.55	52	0.46	0.0883	(1.53)
Others	5265	1.04	5213	13.72	52	14.37	-0.642	(-0.62)
Hispanic	5265	2.11	5213	30.52	52	28.22	2.297	(1.09)
Color	5265	2.48	5213	45.98	52	41.20	4.775	(1.93)
White (1990)	5265	1.82	5213	76.79	52	76.32	0.475	(0.26)
Black	5265	1.59	5213	10.87	52	11.75	-0.876	(-0.55)
Asian	5265	0.25	5213	1.79	52	0.81	0.980***	(3.96)
Native American	5265	0.06	5213	0.44	52	0.32	0.115	(1.92)
Others	5265	0.95	5213	9.71	52	10.82	-1.107	(-1.16)
Hispanic	5265	1.87	5213	23.66	52	22.12	1.548	(0.83)
Color	5265	2.31	5213	36.60	52	34.91	1.694	(0.73)

*p<0.05, **p<0.01, ***p<0.001

60. Vermont Yankee Nuclear Power Plant, Vermont

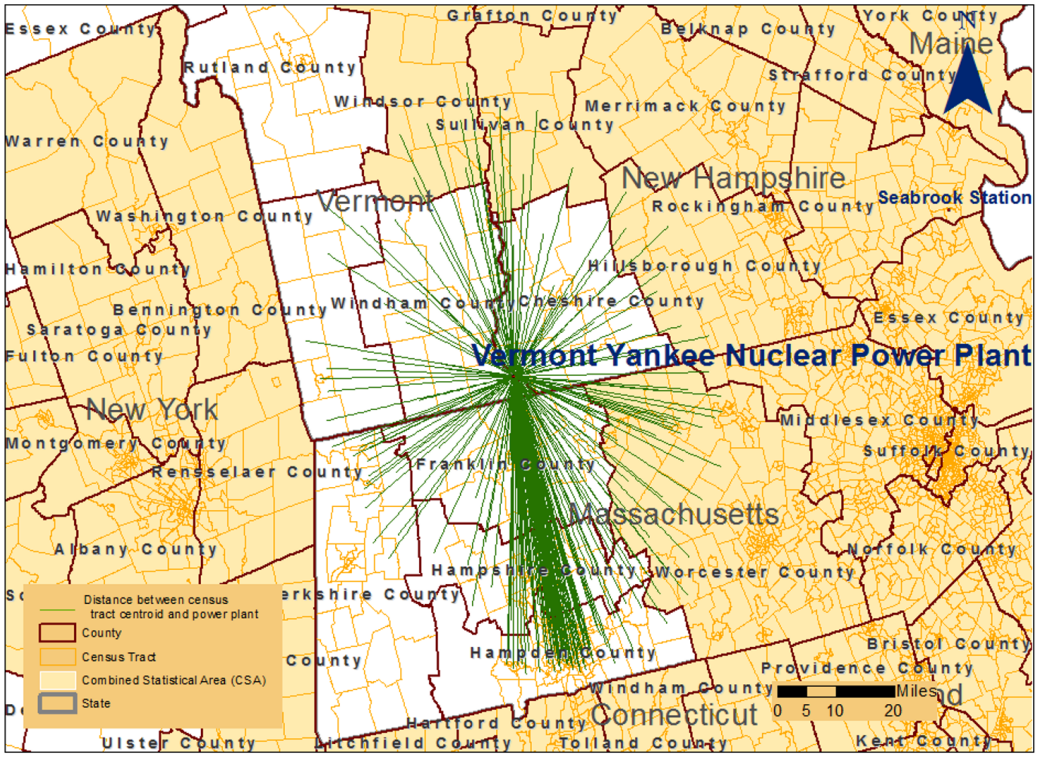

Figure B. 60 Distance to census-tract center points of census tracts within a 50-mile radius of Vermont Yankee Nuclear Power Plant, Vermont in 1990, 2000, and 2010

Table B. 119

Demographic Composition of Population, as sorted by Distance from Vermont Yankee Nuclear Power Plant, Vermont in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	8	30	37	69	85	229	1,728
Tract area (sq. mile)	262	1,016	1,664	1,910	604	5,456	24,064
Total population	31,215	107,523	144,241	249,602	360,716	893,297	6,795,142
White	30,691	106,076	138,277	241,483	302,995	819,522	6,234,123
Black	141	326	1,899	2,274	29,360	34,000	272,346
Asian	186	622	2,658	3,593	2,430	9,489	143,356
Native American	99	194	277	481	637	1,688	15,538
Others	89	311	1,104	1,794	25,276	28,574	129,766
Hispanic	246	804	2,485	4,136	38,332	46,003	245,273
Color	688	1,970	7,368	10,253	69,663	89,942	675,816
White (%)	98.32	98.65	95.87	96.75	84.00	91.74	91.74
Black (%)	0.45	0.30	1.32	0.91	8.14	3.81	4.01
Asian (%)	0.60	0.58	1.84	1.44	0.67	1.06	2.11
Native American (%)	0.32	0.18	0.19	0.19	0.18	0.19	0.23
Others (%)	0.29	0.29	0.77	0.72	7.01	3.20	1.91
Hispanic (%)	0.79	0.75	1.72	1.66	10.63	5.15	3.61
Color (%)	2.20	1.83	5.11	4.11	19.31	10.07	9.95
Female (%)	51.83	51.97	50.91	51.94	52.64	52.06	51.77
Old (65 + years) (%)	14.45	14.29	12.54	13.05	15.38	14.11	13.02
Kid (< 5 years) (%)	8.68	8.45	8.06	8.22	8.93	8.53	8.31
Native-born (%)	97.29	97.76	94.64	95.93	93.89	95.16	91.33
Renter housing units (%)	32.60	29.09	29.53	26.61	39.25	32.57	34.44
Education (%)	21.09	22.56	26.20	24.70	14.38	20.32	27.42
Unemployment (%)	5.50	6.58	7.06	6.04	7.36	6.76	6.56
Poverty (%)	9.11	8.85	10.78	8.68	14.15	11.29	8.30
Mean household income ($)	54,485	57,423	58,999	64,652	55,321	58,677	74,575
Year 2000							
Total population	31,723	110,675	148,389	260,890	359,145	910,822	7,282,888
White	30,779	107,034	139,476	246,839	283,433	807,561	6,332,862
Black	182	620	1,995	2,610	29,082	34,489	314,633
Asian	167	746	3,030	4,063	3,413	11,419	249,346
Native American	54	224	417	532	812	2,039	18,528
Others	536	2,054	3,452	6,873	42,392	55,307	367,526
Hispanic	365	1,448	3,275	6,341	56,846	68,275	384,291
Color	1,204	4,444	10,778	16,996	92,993	126,415	1,109,871
White (%)	97.02	96.71	93.99	94.61	78.92	88.66	86.96
Black (%)	0.57	0.56	1.34	1.00	8.10	3.79	4.32
Asian (%)	0.53	0.67	2.04	1.56	0.95	1.25	3.42
Native American (%)	0.17	0.20	0.28	0.20	0.23	0.22	0.25
Others (%)	1.69	1.86	2.33	2.63	11.80	6.07	5.05
Hispanic (%)	1.15	1.31	2.21	2.43	15.83	7.50	5.28
Color (%)	3.80	4.02	7.26	6.51	25.89	13.88	15.24
Female (%)	51.96	51.54	51.02	52.15	52.06	51.85	51.58
Old (65 + years) (%)	14.34	14.54	13.00	13.49	14.99	14.16	13.13
Kid (< 5 years) (%)	6.42	6.17	6.24	6.55	7.72	6.91	7.51
Native-born (%)	97.14	97.11	95.15	95.75	93.23	94.87	88.96
Renter housing units (%)	30.90	29.17	28.21	25.62	37.66	31.30	33.45
College degree or higher (%)	24.94	26.34	28.97	29.67	16.87	23.96	33.24
Unemployment (%)	4.16	5.60	5.71	4.48	5.73	5.27	4.30
Poverty (%)	9.04	9.15	10.58	8.04	15.45	11.56	8.60
Mean household income ($)	58,465	61,137	64,233	69,272	56,838	62,142	82,540
Year 2010							
Total population	32,118	112,611	155,355	271,013	366,098	937,195	7,478,098
White	30,724	107,439	143,514	253,027	289,785	824,489	6,303,075
Black	229	1,080	2,472	4,058	31,120	38,959	403,024
Asian	335	1,174	4,716	5,525	4,677	16,427	357,284
Native American	138	256	375	393	1,019	2,181	15,070
Others	692	2,662	4,278	8,010	39,497	55,139	399,645
Hispanic	420	2,767	4,941	9,009	74,931	92,068	537,399
Color	1,607	6,915	14,847	22,984	113,593	159,946	1,433,035
White (%)	95.66	95.41	92.38	93.36	79.16	87.97	84.29

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	0.71	0.96	1.59	1.50	8.50	4.16	5.39
Asian (%)	1.04	1.04	3.04	2.04	1.28	1.75	4.78
Native American (%)	0.43	0.23	0.24	0.15	0.28	0.23	0.20
Others (%)	2.15	2.36	2.75	2.96	10.79	5.88	5.34
Hispanic (%)	1.31	2.46	3.18	3.32	20.47	9.82	7.19
Color (%)	5.00	6.14	9.56	8.48	31.03	17.07	19.16
Female (%)	51.02	51.34	50.10	52.19	52.04	51.64	51.39
Old (65 + years) (%)	16.79	14.57	13.17	13.65	14.39	14.08	13.40
Kid (< 5 years) (%)	4.54	4.70	4.57	4.96	5.93	5.23	5.67
Native-born (%)	96.77	96.62	94.48	94.86	92.09	94.00	86.90
Renter housing units (%)	31.19	26.55	24.72	22.61	35.99	28.84	30.27
College degree or higher (%)	28.14	30.14	32.20	33.05	20.20	27.40	38.24
Unemployment (%)	7.11	8.07	8.21	6.40	9.97	8.22	6.86
Poverty (%)	10.76	10.65	12.40	9.07	18.18	13.46	9.74
Mean household income ($)	57,867	64,072	67,281	72,168	56,468	63,703	85,722
Index	60	60	60	60	60	60	60

Table B. 120

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Vermont Yankee Nuclear Power Plant, Vermont

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	1957	1.20	1728	82.65	229	88.01	-5.357***	(-4.45)
Black	1957	0.64	1728	5.78	229	4.04	1.744**	(2.74)
Asian	1957	0.24	1728	4.61	229	1.61	2.999***	(12.73)
Native American	1957	0.03	1728	0.21	229	0.24	-0.0327	(-0.95)
Others	1957	0.68	1728	5.76	229	6.09	-0.337	(-0.50)
Hispanic	1957	1.30	1728	7.73	229	10.66	-2.930*	(-2.25)
Color	1957	1.67	1728	19.96	229	17.58	2.377	(1.43)
White (2000)	1957	1.33	1728	86.10	229	88.08	-1.981	(-1.48)
Black	1957	0.65	1728	4.70	229	3.57	1.125	(1.72)
Asian	1957	0.19	1728	3.44	229	1.19	2.253***	(12.08)
Native American	1957	0.02	1728	0.27	229	0.22	0.0478*	(2.10)
Others	1957	0.83	1728	5.50	229	6.49	-0.997	(-1.21)
Hispanic	1957	1.15	1728	5.79	229	8.10	-2.319*	(-2.02)
Color	1957	1.54	1728	16.19	229	14.15	2.041	(1.33)
White (1990)	1957	1.13	1728	91.17	229	92.20	-1.029	(-0.91)
Black	1957	0.70	1728	4.31	229	3.32	0.993	(1.42)
Asian	1957	0.17	1728	2.16	229	1.00	1.157***	(6.87)
Native American	1957	0.04	1728	0.29	229	0.19	0.0995**	(2.61)
Others	1957	0.68	1728	2.12	229	3.27	-1.152	(-1.69)
Hispanic	1957	0.92	1728	3.95	229	5.21	-1.262	(-1.37)
Color	1957	1.31	1728	10.56	229	9.60	0.961	(0.73)

*p<0.05, **p<0.01, ***p<0.001

61. North Anna Power Station, Virginia

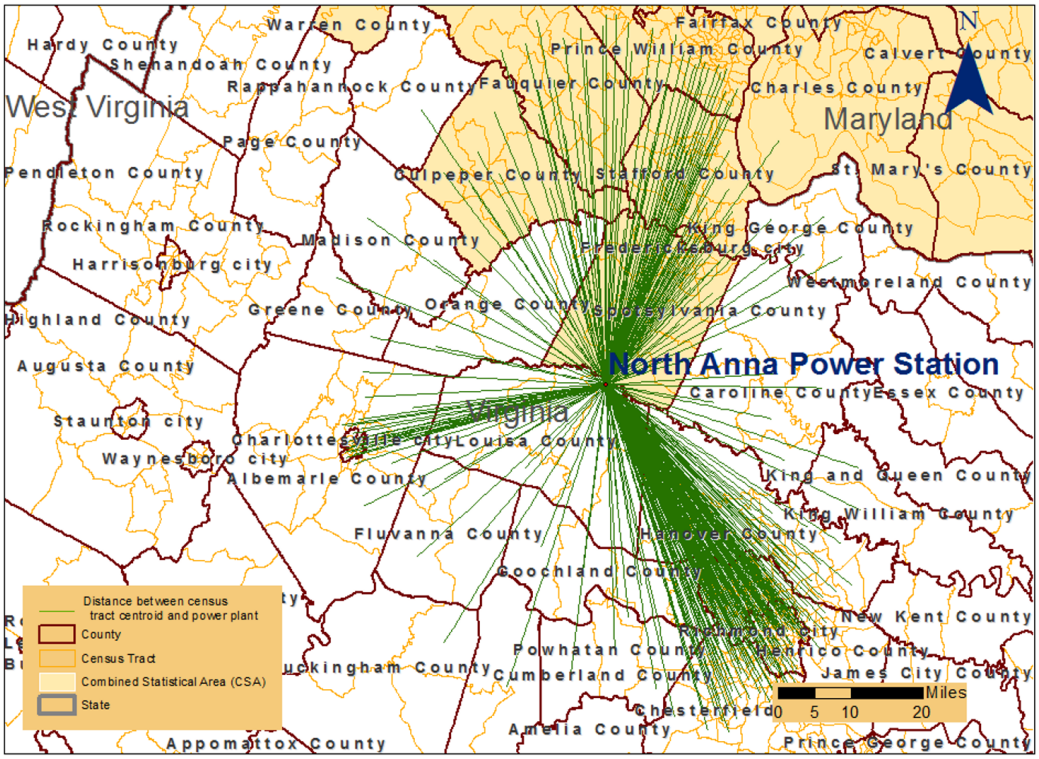

Figure B. 61 Distance to census-tract center points of census tracts within a 50-mile radius of North Anna Power Station, Virginia in 1990, 2000, and 2010

Table B. 121

Demographic Composition of Population, as sorted by Distance from North Anna Power Station, Virginia in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	6	26	55	134	143	364	2,949
Tract area (sq. mile)	363	1,037	1,730	1,502	1,549	6,181	49,000
Total population	14,747	64,514	147,361	402,522	455,975	1,085,119	9,883,689
White	11,623	51,398	120,330	335,257	292,911	811,519	7,378,020
Black	2,928	12,457	24,930	58,353	153,511	252,179	2,099,796
Asian	101	250	961	6,986	6,554	14,852	281,608
Native American	80	184	563	806	1,265	2,898	27,740
Others	21	237	561	1,128	1,726	3,673	96,481
Hispanic	70	563	1,567	4,522	5,427	12,149	263,207
Color	3,172	13,545	28,005	70,370	166,449	281,541	2,654,430
White (%)	78.82	79.67	81.66	83.29	64.24	74.79	74.65
Black (%)	19.85	19.31	16.92	14.50	33.67	23.24	21.25
Asian (%)	0.68	0.39	0.65	1.74	1.44	1.37	2.85
Native American (%)	0.54	0.29	0.38	0.20	0.28	0.27	0.28
Others (%)	0.14	0.37	0.38	0.28	0.38	0.34	0.98
Hispanic (%)	0.47	0.87	1.06	1.12	1.19	1.12	2.66
Color (%)	21.51	21.00	19.00	17.48	36.50	25.95	26.86
Female (%)	49.91	50.55	51.33	52.09	51.82	51.75	51.16
Old (65 + years) (%)	11.76	9.23	12.34	11.56	9.46	10.65	10.76
Kid (< 5 years) (%)	8.79	9.75	8.43	8.21	9.56	8.91	8.69
Native-born (%)	98.69	98.92	98.22	96.64	97.55	97.40	93.96
Renter housing units (%)	11.23	16.68	26.57	33.05	34.61	31.63	31.53
Education (%)	7.51	14.42	19.05	31.19	23.46	25.03	25.38
Unemployment (%)	5.77	3.72	3.34	3.04	4.39	3.71	4.48
Poverty (%)	13.37	7.29	7.15	7.31	11.67	9.22	9.40
Mean household income ($)	57,543	65,484	67,508	74,276	65,708	69,120	73,231
Year 2000							
Total population	19,529	92,932	194,575	505,701	509,752	1,322,489	11,052,512
White	16,115	73,360	156,391	397,440	301,023	944,329	7,563,621
Black	2,964	16,117	30,418	78,514	181,818	309,831	2,542,420
Asian	118	837	2,224	14,738	9,363	27,280	444,435
Native American	30	357	681	1,602	1,819	4,489	33,556
Others	317	2,275	4,836	13,408	15,737	36,573	468,467
Hispanic	85	1,747	4,128	12,180	15,592	33,732	520,646
Color	3,471	20,635	40,365	114,911	215,072	394,454	3,729,566
White (%)	82.52	78.94	80.38	78.59	59.05	71.41	68.43
Black (%)	15.18	17.34	15.63	15.53	35.67	23.43	23.00
Asian (%)	0.60	0.90	1.14	2.91	1.84	2.06	4.02
Native American (%)	0.15	0.38	0.35	0.32	0.36	0.34	0.30
Others (%)	1.62	2.45	2.49	2.65	3.09	2.77	4.24
Hispanic (%)	0.44	1.88	2.12	2.41	3.06	2.55	4.71
Color (%)	17.77	22.20	20.75	22.72	42.19	29.83	33.74
Female (%)	49.83	50.54	51.26	51.78	51.98	51.66	51.28
Old (65 + years) (%)	11.84	8.67	12.46	11.10	9.61	10.57	11.30
Kid (< 5 years) (%)	7.56	8.79	7.58	7.91	8.42	8.12	7.91
Native-born (%)	98.52	97.71	96.89	94.29	95.50	95.44	90.70
Renter housing units (%)	11.12	14.81	25.17	31.32	32.33	29.39	29.75
College degree or higher (%)	12.00	18.76	26.63	37.69	27.29	30.36	30.31
Unemployment (%)	3.63	3.08	3.51	3.03	4.84	3.80	4.52
Poverty (%)	9.07	6.36	6.84	7.10	11.16	8.62	9.18
Mean household income ($)	63,854	74,573	78,375	81,903	71,855	76,783	80,212
Year 2010							
Total population	23,603	123,759	249,849	579,607	576,540	1,553,358	11,984,819
White	20,170	93,596	189,992	432,068	325,312	1,061,138	7,815,053
Black	2,667	23,261	40,418	97,102	204,309	367,757	2,829,628
Asian	25	1,734	7,227	24,751	17,741	51,478	678,333
Native American	74	389	809	1,727	2,273	5,272	35,882
Others	667	4,779	11,403	23,959	26,905	67,713	625,923
Hispanic	370	7,601	12,663	30,376	40,594	91,604	913,308
Color	3,577	34,485	65,145	164,562	275,434	543,203	4,664,333
White (%)	85.46	75.63	76.04	74.54	56.42	68.31	65.21

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	11.30	18.80	16.18	16.75	35.44	23.67	23.61
Asian (%)	0.11	1.40	2.89	4.27	3.08	3.31	5.66
Native American (%)	0.31	0.31	0.32	0.30	0.39	0.34	0.30
Others (%)	2.83	3.86	4.56	4.13	4.67	4.36	5.22
Hispanic (%)	1.57	6.14	5.07	5.24	7.04	5.90	7.62
Color (%)	15.15	27.86	26.07	28.39	47.77	34.97	38.92
Female (%)	50.72	50.50	51.24	50.98	52.29	51.47	51.19
Old (65 + years) (%)	13.62	8.90	12.76	11.54	9.67	10.86	12.00
Kid (< 5 years) (%)	4.75	6.97	6.57	6.31	6.92	6.61	6.41
Native-born (%)	98.59	95.40	93.96	90.88	92.03	92.28	87.66
Renter housing units (%)	12.97	17.75	23.10	29.25	30.68	27.67	27.95
College degree or higher (%)	17.62	25.36	31.31	41.09	31.09	34.23	34.66
Unemployment (%)	6.63	6.58	6.13	4.89	7.55	6.24	6.21
Poverty (%)	11.16	7.96	7.43	8.58	12.51	9.87	9.53
Mean household income ($)	75,634	80,880	87,353	87,536	75,335	82,290	86,787
Index	61	61	61	61	61	61	61

Table B. 122

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding North Anna Power Station, Virginia

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	3313	1.40	2949	63.42	364	67.54	-4.115**	(-2.94)
Black	3313	1.36	2949	24.48	364	24.56	-0.0812	(-0.06)
Asian	3313	0.26	2949	5.28	364	3.07	2.210***	(8.44)
Native American	3313	0.04	2949	0.31	364	0.33	-0.0183	(-0.43)
Others	3313	0.23	2949	4.91	364	4.23	0.685**	(2.92)
Hispanic	3313	0.38	2949	7.22	364	5.77	1.444***	(3.79)
Color	3313	1.42	2949	38.91	364	35.47	3.440*	(2.42)
White (2000)	3313	1.42	2949	68.00	364	70.48	-2.482	(-1.75)
Black	3313	1.42	2949	23.58	364	24.39	-0.808	(-0.57)
Asian	3313	0.16	2949	3.92	364	1.97	1.956***	(12.51)
Native American	3313	0.05	2949	0.34	364	0.35	-0.00983	(-0.22)
Others	3313	0.17	2949	4.14	364	2.81	1.331***	(7.96)
Hispanic	3313	0.19	2949	4.53	364	2.55	1.984***	(10.18)
Color	3313	1.42	2949	33.86	364	30.78	3.081*	(2.18)
White (1990)	3313	1.41	2949	75.41	364	75.60	-0.194	(-0.14)
Black	3313	1.41	2949	20.33	364	22.15	-1.816	(-1.29)
Asian	3313	0.12	2949	2.84	364	1.31	1.525***	(12.80)
Native American	3313	0.07	2949	0.32	364	0.34	-0.0138	(-0.19)
Others	3313	0.07	2949	1.02	364	0.32	0.697***	(10.46)
Hispanic	3313	0.11	2949	2.64	364	1.14	1.491***	(13.44)
Color	3313	1.38	2949	25.72	364	24.89	0.826	(0.60)

62. Surry Nuclear Power Station, Virginia

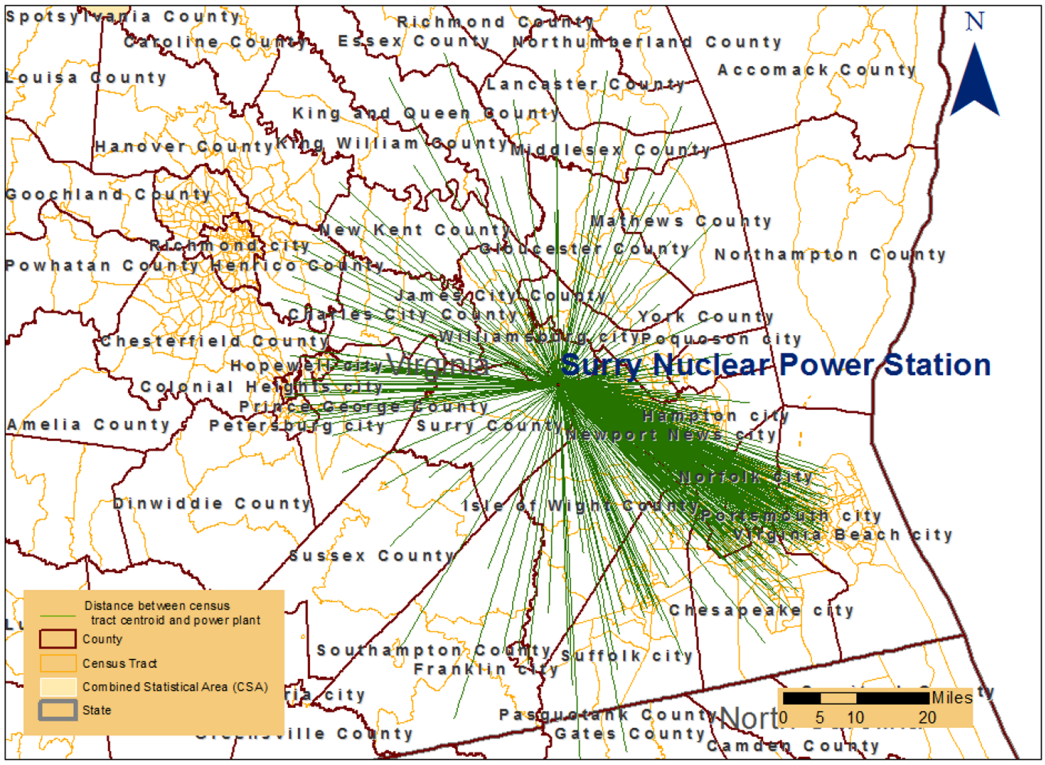

Figure B. 62 Distance to census-tract center points of census tracts within a 50-mile radius of Surry Nuclear Power Station, Virginia in 1990, 2000, and 2010

Table B. 123

Demographic Composition of Population, as sorted by Distance from Surry Nuclear Power Station, Virginia in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	29	73	93	212	43	450	3,652
Tract area (sq. mile)	356	892	1,551	1,797	1,003	5,599	90,995
Total population	108,530	252,904	321,598	700,649	140,317	1,523,998	11,291,965
White	77,393	175,672	214,999	434,235	108,717	1,011,016	8,793,509
Black	25,781	71,447	96,457	243,662	24,512	461,859	2,156,541
Asian	3,475	3,897	5,852	15,862	5,379	34,465	174,720
Native American	318	799	1,686	2,601	634	6,038	92,949
Others	1,575	1,078	2,622	4,287	1,069	10,631	74,215
Hispanic	3,403	3,822	7,214	13,015	3,484	30,938	193,446
Color	32,483	79,362	109,808	273,258	33,323	528,234	2,607,563
White (%)	71.31	69.46	66.85	61.98	77.48	66.34	77.87
Black (%)	23.75	28.25	29.99	34.78	17.47	30.31	19.10
Asian (%)	3.20	1.54	1.82	2.26	3.83	2.26	1.55
Native American (%)	0.29	0.32	0.52	0.37	0.45	0.40	0.82
Others (%)	1.45	0.43	0.82	0.61	0.76	0.70	0.66
Hispanic (%)	3.14	1.51	2.24	1.86	2.48	2.03	1.71
Color (%)	29.93	31.38	34.14	39.00	23.75	34.66	23.09
Female (%)	50.04	51.19	47.25	51.54	50.14	50.34	51.40
Old (65 + years) (%)	7.19	10.46	10.24	10.66	6.49	9.91	11.63
Kid (< 5 years) (%)	9.81	9.40	8.93	9.76	10.71	9.61	8.21
Native-born (%)	94.86	97.19	97.09	96.91	95.73	96.74	96.66
Renter housing units (%)	38.79	36.15	36.33	36.41	24.77	35.51	28.95
Education (%)	26.08	20.02	18.38	16.82	18.71	18.48	21.10
Unemployment (%)	5.10	5.75	6.33	6.39	4.61	6.00	4.48
Poverty (%)	8.95	10.79	12.58	13.27	6.94	11.81	11.64
Mean household income ($)	64,169	59,585	56,975	57,769	66,543	59,126	61,416
Year 2000							
Total population	121,515	297,971	331,503	724,082	170,125	1,645,196	13,482,632
White	78,854	192,505	199,550	406,629	119,672	997,210	9,921,884
Black	33,064	89,683	111,240	273,671	34,826	542,484	2,575,678
Asian	3,586	5,976	6,728	18,159	8,417	42,866	332,097
Native American	604	1,157	2,032	3,293	619	7,705	115,645
Others	5,412	8,639	11,986	22,295	6,610	54,942	537,317
Hispanic	5,287	7,587	10,008	18,109	6,164	47,155	653,082
Color	44,981	108,939	135,586	325,179	53,621	668,306	3,846,659
White (%)	64.89	64.61	60.20	56.16	70.34	60.61	73.59
Black (%)	27.21	30.10	33.56	37.80	20.47	32.97	19.10
Asian (%)	2.95	2.01	2.03	2.51	4.95	2.61	2.46
Native American (%)	0.50	0.39	0.61	0.45	0.36	0.47	0.86
Others (%)	4.45	2.90	3.62	3.08	3.89	3.34	3.99
Hispanic (%)	4.35	2.55	3.02	2.50	3.62	2.87	4.84
Color (%)	37.02	36.56	40.90	44.91	31.52	40.62	28.53
Female (%)	50.98	51.06	48.80	52.07	50.69	51.00	51.02
Old (65 + years) (%)	10.48	11.10	10.82	11.84	7.52	10.95	11.72
Kid (< 5 years) (%)	8.29	8.01	7.66	8.27	8.74	8.15	7.92
Native-born (%)	94.52	96.18	96.12	96.03	94.03	95.76	93.10
Renter housing units (%)	33.37	35.12	33.98	34.94	22.90	33.52	27.74
College degree or higher (%)	30.09	25.04	21.36	20.05	23.56	22.31	26.15
Unemployment (%)	9.22	4.42	6.31	5.80	4.27	5.74	4.71
Poverty (%)	8.72	9.45	11.98	12.66	6.46	11.00	11.03
Mean household income ($)	72,811	64,749	62,916	62,622	73,177	64,827	70,393
Year 2010							
Total population	133,856	313,540	350,480	760,375	182,845	1,741,096	15,371,836
White	82,362	200,937	208,094	413,362	123,893	1,028,648	10,905,054
Black	38,403	93,141	118,805	294,501	38,901	583,751	2,929,341
Asian	5,491	8,059	8,781	23,183	11,486	57,000	565,423
Native American	263	928	1,784	2,682	617	6,274	124,693
Others	7,337	10,475	13,016	26,647	7,948	65,423	847,325
Hispanic	9,876	12,427	18,294	31,137	10,416	82,150	1,216,224
Color	57,482	120,163	152,312	365,185	65,643	760,785	5,072,013
White (%)	61.53	64.09	59.37	54.36	67.76	59.08	70.94

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	28.69	29.71	33.90	38.73	21.28	33.53	19.06
Asian (%)	4.10	2.57	2.51	3.05	6.28	3.27	3.68
Native American (%)	0.20	0.30	0.51	0.35	0.34	0.36	0.81
Others (%)	5.48	3.34	3.71	3.50	4.35	3.76	5.51
Hispanic (%)	7.38	3.96	5.22	4.09	5.70	4.72	7.91
Color (%)	42.94	38.32	43.46	48.03	35.90	43.70	33.00
Female (%)	49.85	51.91	49.69	51.50	50.47	50.98	51.11
Old (65 + years) (%)	12.04	12.97	11.04	12.20	9.37	11.79	12.31
Kid (< 5 years) (%)	6.36	6.00	6.83	6.64	5.93	6.47	6.61
Native-born (%)	91.76	94.32	95.11	94.45	92.03	94.10	90.71
Renter housing units (%)	31.95	32.15	32.06	33.09	21.26	31.47	27.22
College degree or higher (%)	32.47	29.21	24.82	23.56	27.69	25.94	30.06
Unemployment (%)	5.33	5.99	7.36	7.60	4.49	6.74	7.51
Poverty (%)	9.30	9.02	12.02	11.86	6.41	10.60	13.42
Mean household income ($)	76,794	72,330	67,347	66,378	80,390	69,885	71,291
Index	62	62	62	62	62	62	62

Table B. 124

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Surry Nuclear Power Station, Virginia

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	4102	1.38	3652	69.99	450	55.81	14.19***	(10.31)
Black	4102	1.34	3652	19.15	450	34.52	-15.38***	(-11.49)
Asian	4102	0.20	3652	3.61	450	2.97	0.650**	(3.19)
Native American	4102	0.09	3652	0.80	450	0.36	0.438***	(4.94)
Others	4102	0.18	3652	5.27	450	3.46	1.814***	(10.29)
Hispanic	4102	0.25	3652	7.53	450	4.38	3.159***	(12.58)
Color	4102	1.34	3652	32.58	450	43.88	-11.30***	(-8.44)
White (2000)	4102	1.33	3652	73.76	450	59.24	14.52***	(10.90)
Black	4102	1.35	3652	18.91	450	34.47	-15.57***	(-11.50)
Asian	4102	0.16	3652	2.50	450	2.44	0.0594	(0.37)
Native American	4102	0.24	3652	0.83	450	0.67	0.164	(0.69)
Others	4102	0.47	3652	3.85	450	3.65	0.199	(0.42)
Hispanic	4102	0.27	3652	4.67	450	2.88	1.788***	(6.72)
Color	4102	1.31	3652	28.14	450	41.21	-13.07***	(-9.96)
White (1990)	4102	1.36	3652	78.79	450	66.15	12.64***	(9.27)
Black	4102	1.37	3652	17.95	450	30.51	-12.56***	(-9.14)
Asian	4102	0.26	3652	1.52	450	2.37	-0.843**	(-3.20)
Native American	4102	0.24	3652	0.79	450	0.63	0.162	(0.67)
Others	4102	0.25	3652	0.62	450	0.97	-0.356	(-1.44)
Hispanic	4102	0.12	3652	1.66	450	1.89	-0.228	(-1.89)
Color	4102	1.33	3652	21.81	450	34.09	-12.28***	(-9.22)

*p<0.05, **p<0.01, ***p<0.001

63. Columbia Generating Station, Washington

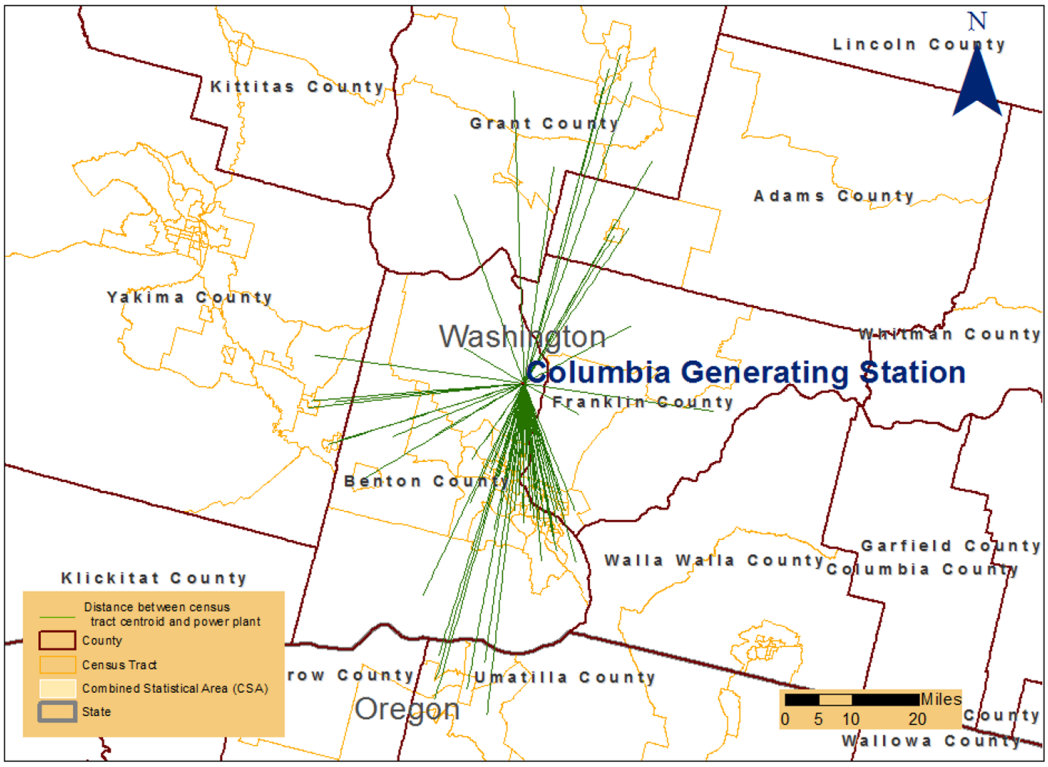

Figure B. 63 Distance to census-tract center points of census tracts within a 50-mile radius of Columbia Generating Station, Washington in 1990, 2000, and 2010

Table B. 125

Demographic Composition of Population, as sorted by Distance from Columbia Generating Station, Washington in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	1	31	22	8	9	71	2,221
Tract area (sq. mile)	209	1,136	1,432	1,479	525	4,782	164,895
Total population	3,530	80,090	83,319	28,897	38,595	234,431	7,474,582
White	3,030	70,657	66,091	17,605	33,563	190,946	6,760,395
Black	43	1,159	1,088	128	318	2,736	190,052
Asian	51	2,159	1,019	164	536	3,929	275,017
Native American	7	733	525	117	494	1,876	122,977
Others	397	5,376	14,604	10,879	3,691	34,947	126,184
Hispanic	810	8,135	18,057	13,558	5,302	45,862	270,747
Color	913	12,102	20,642	13,943	6,625	54,225	845,064
White (%)	85.84	88.22	79.32	60.92	86.96	81.45	90.45
Black (%)	1.22	1.45	1.31	0.44	0.82	1.17	2.54
Asian (%)	1.44	2.70	1.22	0.57	1.39	1.68	3.68
Native American (%)	0.20	0.92	0.63	0.40	1.28	0.80	1.65
Others (%)	11.25	6.71	17.53	37.65	9.56	14.91	1.69
Hispanic (%)	22.95	10.16	21.67	46.92	13.74	19.56	3.62
Color (%)	25.86	15.11	24.77	48.25	17.17	23.13	11.31
Female (%)	45.38	50.35	49.56	49.17	50.38	49.85	50.60
Old (65 + years) (%)	7.45	10.72	9.49	10.13	12.48	10.45	12.61
Kid (< 5 years) (%)	12.52	9.71	11.34	13.36	9.93	10.82	8.82
Native-born (%)	85.33	93.30	89.70	79.77	93.41	90.25	94.13
Renter housing units (%)	23.65	34.90	34.51	36.26	33.88	34.57	34.34
Education (%)	18.59	25.49	14.58	9.45	12.73	17.64	22.19
Unemployment (%)	3.84	5.84	8.05	11.77	8.41	7.67	5.84
Poverty (%)	13.37	11.38	18.15	24.29	17.55	16.43	11.32
Mean household income ($)	68,778	62,309	53,379	45,794	46,521	54,816	60,293
Year 2000							
Total population	4,364	104,495	104,464	38,349	51,242	302,914	9,012,606
White	3,610	85,968	75,638	19,906	40,740	225,862	7,546,720
Black	20	1,226	1,088	95	860	3,289	234,795
Asian	7	2,998	1,189	252	684	5,130	444,306
Native American	0	494	936	202	294	1,926	132,807
Others	726	13,793	25,626	17,889	8,668	66,702	653,983
Hispanic	1,346	17,685	35,415	24,803	11,912	91,161	622,618
Color	1,403	24,533	39,916	25,431	14,360	105,643	1,703,621
White (%)	82.72	82.27	72.41	51.91	79.51	74.56	83.74
Black (%)	0.46	1.17	1.04	0.25	1.68	1.09	2.61
Asian (%)	0.16	2.87	1.14	0.66	1.33	1.69	4.93
Native American (%)	0.00	0.47	0.90	0.53	0.57	0.64	1.47
Others (%)	16.64	13.20	24.53	46.65	16.92	22.02	7.26
Hispanic (%)	30.84	16.92	33.90	64.68	23.25	30.09	6.91
Color (%)	32.15	23.48	38.21	66.31	28.02	34.88	18.90
Female (%)	45.53	49.65	49.90	48.20	49.87	49.53	50.36
Old (65 + years) (%)	7.95	10.37	9.02	8.42	11.27	9.78	11.88
Kid (< 5 years) (%)	8.68	9.21	10.70	13.10	9.92	10.33	7.87
Native-born (%)	85.15	88.28	83.12	67.04	89.25	83.93	90.51
Renter housing units (%)	23.36	29.09	31.09	34.76	31.04	30.64	32.88
College degree or higher (%)	14.80	28.64	15.37	10.32	14.14	19.40	26.97
Unemployment (%)	7.76	6.32	8.98	15.51	8.91	8.74	6.25
Poverty (%)	7.42	10.91	16.24	24.64	13.08	14.82	10.86
Mean household income ($)	78,951	73,296	61,975	50,840	57,875	64,507	70,554
Year 2010							
Total population	6,007	136,709	118,655	42,256	61,782	365,409	9,957,813
White	5,309	105,263	84,008	29,521	51,267	275,368	8,144,049
Black	29	2,314	1,514	161	741	4,759	291,553
Asian	74	4,332	2,004	121	660	7,191	633,904
Native American	0	1,274	1,297	321	874	3,766	152,058
Others	595	23,526	29,832	12,132	8,240	74,325	736,249
Hispanic	1,039	31,535	48,639	31,650	18,973	131,836	979,907
Color	1,211	41,078	54,415	32,270	22,168	151,142	2,350,377
White (%)	88.38	77.00	70.80	69.86	82.98	75.36	81.79

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	0.48	1.69	1.28	0.38	1.20	1.30	2.93
Asian (%)	1.23	3.17	1.69	0.29	1.07	1.97	6.37
Native American (%)	0.00	0.93	1.09	0.76	1.41	1.03	1.53
Others (%)	9.91	17.21	25.14	28.71	13.34	20.34	7.39
Hispanic (%)	17.30	23.07	40.99	74.90	30.71	36.08	9.84
Color (%)	20.16	30.05	45.86	76.37	35.88	41.36	23.60
Female (%)	44.18	49.87	49.52	48.56	47.32	49.08	50.35
Old (65 + years) (%)	9.59	10.46	9.92	8.02	10.97	10.07	12.57
Kid (< 5 years) (%)	9.99	8.72	8.29	10.41	9.08	8.86	6.31
Native-born (%)	90.66	86.31	80.56	64.76	87.01	82.14	88.63
Renter housing units (%)	16.20	28.89	30.46	36.90	33.34	30.76	32.44
College degree or higher (%)	17.45	28.27	16.75	7.84	14.78	20.04	30.46
Unemployment (%)	2.02	6.59	8.46	12.71	9.54	8.26	7.98
Poverty (%)	7.82	13.50	18.67	29.34	15.81	17.33	12.64
Mean household income ($)	79,791	72,614	59,086	47,739	58,236	63,491	70,963
Index	63	63	63	63	63	63	63

Table B. 126

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Columbia Generating Station, Washington

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	2292	2.17	2221	81.40	71	76.15	5.255*	(2.42)
Black	2292	0.23	2221	2.85	71	1.28	1.571***	(6.71)
Asian	2292	0.34	2221	5.98	71	1.90	4.078***	(12.06)
Native American	2292	0.27	2221	1.67	71	1.14	0.523	(1.95)
Others	2292	1.86	2221	7.15	71	18.12	-10.96***	(-5.89)
Hispanic	2292	3.06	2221	9.31	71	31.62	-22.32***	(-7.28)
Color	2292	2.92	2221	22.73	71	36.93	-14.20***	(-4.87)
White (2000)	2292	2.00	2221	84.16	71	78.91	5.258*	(2.63)
Black	2292	0.17	2221	2.53	71	0.90	1.629***	(9.70)
Asian	2292	0.22	2221	4.67	71	1.68	2.993***	(13.72)
Native American	2292	0.14	2221	1.66	71	0.58	1.083***	(8.02)
Others	2292	1.97	2221	6.92	71	18.04	-11.11***	(-5.65)
Hispanic	2292	2.82	2221	6.50	71	25.35	-18.84***	(-6.69)
Color	2292	2.76	2221	18.33	71	29.74	-11.41***	(-4.13)
White (1990)	2292	1.87	2221	90.86	71	84.89	5.966**	(3.19)
Black	2292	0.24	2221	2.32	71	1.05	1.270***	(5.36)
Asian	2292	1.40	2221	3.36	71	2.92	0.443	(0.32)
Native American	2292	1.41	2221	1.80	71	2.05	-0.253	(-0.18)
Others	2292	2.19	2221	1.57	71	13.18	-11.61***	(-5.31)
Hispanic	2292	2.34	2221	3.45	71	17.39	-13.94***	(-5.95)
Color	2292	2.09	2221	10.76	71	19.23	-8.472***	(-4.06)

*p<0.05, **p<0.01, ***p<0.001

64. Kewaunee Power Station, Wisconsin

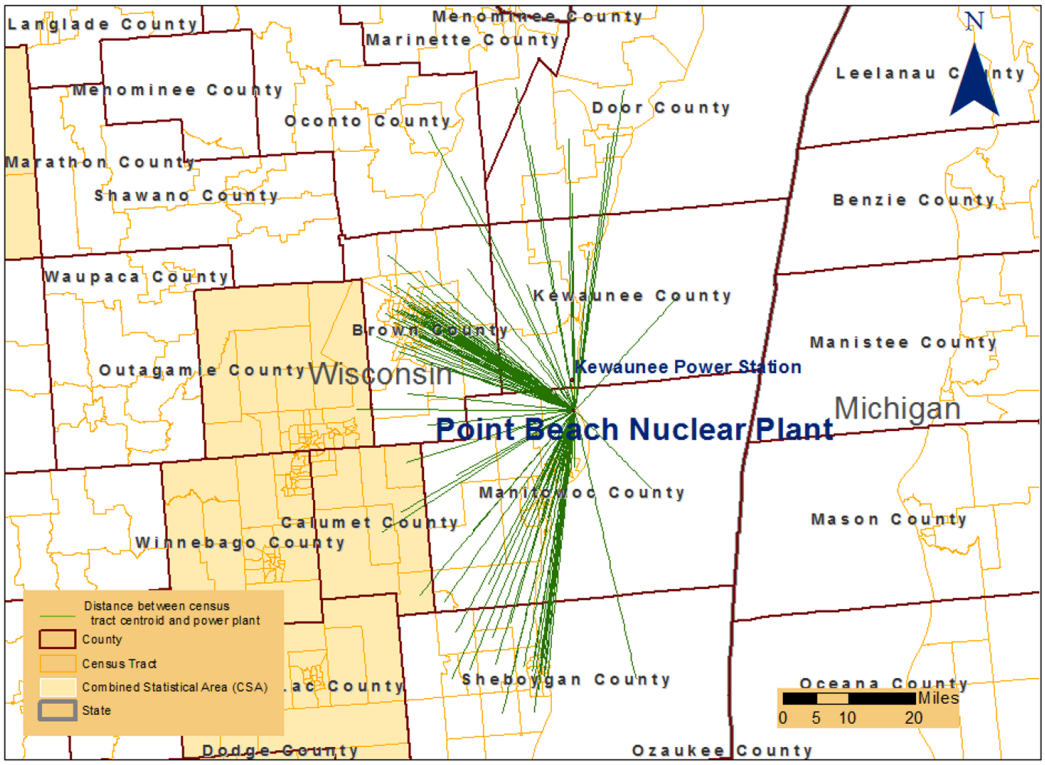

Figure B. 64 Distance to census-tract center points of census tracts within a 50-mile radius of Kewaunee Power Station, Wisconsin in 1990, 2000, and 2010

Table B. 127

Demographic Composition of Population, as sorted by Distance from Kewaunee Power Station, Wisconsin in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	2	16	55	18	24	115	1,294
Tract area (sq. mile)	184	504	2,419	862	1,349	5,318	60,178
Total population	10,660	61,680	198,600	59,362	90,568	420,870	4,470,898
White	10,574	60,764	191,016	56,751	87,390	406,495	4,107,815
Black	16	38	1,054	82	181	1,371	242,933
Asian	10	493	3,148	81	1,986	5,718	47,342
Native American	55	257	2,880	2,421	362	5,975	33,742
Others	4	127	499	34	643	1,307	39,055
Hispanic	25	290	1,541	298	1,417	3,571	84,035
Color	101	1,081	8,473	2,801	3,872	16,328	406,347
White (%)	99.19	98.51	96.18	95.60	96.49	96.58	91.88
Black (%)	0.15	0.06	0.53	0.14	0.20	0.33	5.43
Asian (%)	0.09	0.80	1.59	0.14	2.19	1.36	1.06
Native American (%)	0.52	0.42	1.45	4.08	0.40	1.42	0.75
Others (%)	0.04	0.21	0.25	0.06	0.71	0.31	0.87
Hispanic (%)	0.23	0.47	0.78	0.50	1.56	0.85	1.88
Color (%)	0.95	1.75	4.27	4.72	4.28	3.88	9.09
Female (%)	49.25	50.74	51.43	49.92	51.13	51.00	51.09
Old (65 + years) (%)	14.14	14.78	12.41	10.94	15.39	13.23	13.31
Kid (< 5 years) (%)	9.22	8.83	9.24	9.64	8.93	9.17	8.92
Native-born (%)	99.60	98.94	98.26	99.40	96.90	98.26	97.45
Renter housing units (%)	15.97	23.78	33.77	18.20	28.03	28.43	29.61
Education (%)	8.54	12.96	16.46	13.33	13.64	14.69	18.03
Unemployment (%)	4.36	4.53	4.77	4.13	4.76	4.63	5.25
Poverty (%)	8.63	7.41	9.95	6.40	7.93	8.60	10.90
Mean household income ($)	53,058	54,739	57,321	62,875	56,519	57,382	57,781
Year 2000							
Total population	10,931	67,618	219,263	70,228	97,138	465,178	4,898,497
White	10,818	65,402	199,862	65,990	89,510	431,582	4,341,971
Black	0	110	2,577	129	706	3,522	296,833
Asian	25	883	4,953	508	3,535	9,904	74,750
Native American	7	373	4,164	2,731	358	7,633	42,028
Others	79	844	7,706	881	3,026	12,536	142,916
Hispanic	60	871	9,200	702	3,276	14,109	176,940
Color	138	2,639	22,977	4,564	8,879	39,197	636,829
White (%)	98.97	96.72	91.15	93.97	92.15	92.78	88.64
Black (%)	0.00	0.16	1.18	0.18	0.73	0.76	6.06
Asian (%)	0.23	1.31	2.26	0.72	3.64	2.13	1.53
Native American (%)	0.06	0.55	1.90	3.89	0.37	1.64	0.86
Others (%)	0.72	1.25	3.51	1.25	3.12	2.69	2.92
Hispanic (%)	0.55	1.29	4.20	1.00	3.37	3.03	3.61
Color (%)	1.26	3.90	10.48	6.50	9.14	8.43	13.00
Female (%)	48.82	50.36	50.47	50.22	50.48	50.38	50.65
Old (65 + years) (%)	14.60	14.15	12.12	10.85	14.96	12.87	13.12
Kid (< 5 years) (%)	6.40	7.32	8.09	8.00	7.62	7.83	7.71
Native-born (%)	99.02	98.13	95.76	98.92	95.30	96.56	96.37
Renter housing units (%)	14.49	22.40	34.39	17.40	27.63	28.22	28.35
College degree or higher (%)	11.38	16.97	20.52	18.91	17.11	18.80	22.76
Unemployment (%)	2.99	3.28	4.09	3.03	3.26	3.61	4.78
Poverty (%)	5.81	5.37	7.56	4.45	6.34	6.46	8.87
Mean household income ($)	62,397	66,144	64,767	74,603	65,100	66,386	67,174
Year 2010							
Total population	10,516	70,207	224,312	84,988	99,059	489,082	5,148,865
White	10,303	66,777	197,292	78,915	88,862	442,149	4,472,402
Black	5	405	4,589	504	1,218	6,721	341,941
Asian	56	1,411	6,064	1,219	4,900	13,650	110,345
Native American	60	283	5,238	3,280	544	9,405	39,784
Others	92	1,331	11,129	1,070	3,535	17,157	184,393
Hispanic	205	1,308	17,039	1,246	5,645	25,443	285,106
Color	366	4,247	36,362	6,899	13,066	60,940	841,582
White (%)	97.97	95.11	87.95	92.85	89.71	90.40	86.86

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	0.05	0.58	2.05	0.59	1.23	1.37	6.64
Asian (%)	0.53	2.01	2.70	1.43	4.95	2.79	2.14
Native American (%)	0.57	0.40	2.34	3.86	0.55	1.92	0.77
Others (%)	0.87	1.90	4.96	1.26	3.57	3.51	3.58
Hispanic (%)	1.95	1.86	7.60	1.47	5.70	5.20	5.54
Color (%)	3.48	6.05	16.21	8.12	13.19	12.46	16.35
Female (%)	49.52	50.24	50.65	50.17	50.41	50.44	50.41
Old (65 + years) (%)	17.74	14.98	12.50	11.74	15.09	13.36	13.39
Kid (< 5 years) (%)	4.94	5.88	6.93	5.81	5.92	6.34	6.29
Native-born (%)	98.21	97.57	94.42	98.21	94.19	95.56	95.41
Renter housing units (%)	15.23	20.75	32.48	18.84	25.88	26.69	26.77
College degree or higher (%)	11.60	20.27	22.48	25.46	19.78	21.87	26.17
Unemployment (%)	5.76	6.66	6.67	4.89	6.04	6.21	6.70
Poverty (%)	7.80	7.12	11.62	7.05	9.45	9.63	11.81
Mean household income ($)	61,019	64,911	59,877	76,188	58,486	63,100	65,482
Index	64	64	64	64	64	64	64

Table B. 128

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Kewaunee Power Station, Wisconsin

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	1409	2.09	1294	83.75	115	85.50	-1.749	(-0.84)
Black	1409	0.73	1294	8.52	115	1.81	6.707***	(9.23)
Asian	1409	0.33	1294	2.12	115	2.69	-0.57	(-1.73)
Native American	1409	0.47	1294	0.94	115	2.00	-1.058*	(-2.28)
Others	1409	0.51	1294	3.74	115	3.65	0.0906	(0.18)
Hispanic	1409	0.85	1294	5.79	115	5.50	0.295	(0.35)
Color	1409	1.47	1294	18.63	115	13.20	5.424***	(3.68)
White (2000)	1409	1.91	1294	86.21	115	89.03	-2.821	(-1.48)
Black	1409	0.65	1294	7.53	115	0.94	6.588***	(10.16)
Asian	1409	0.32	1294	1.60	115	2.14	-0.539	(-1.68)
Native American	1409	0.37	1294	1.00	115	1.78	-0.771*	(-2.07)
Others	1409	0.37	1294	3.15	115	2.81	0.343	(0.94)
Hispanic	1409	0.48	1294	3.86	115	3.14	0.717	(1.50)
Color	1409	1.15	1294	14.88	115	8.79	6.094***	(5.30)
White (1990)	1409	1.87	1294	90.66	115	92.72	-2.064	(-1.11)
Black	1409	0.62	1294	5.90	115	0.61	5.284***	(8.47)
Asian	1409	0.24	1294	1.06	115	1.43	-0.365	(-1.49)
Native American	1409	0.39	1294	0.96	115	1.51	-0.556	(-1.43)
Others	1409	0.11	1294	0.96	115	0.33	0.630***	(5.52)
Hispanic	1409	0.18	1294	1.99	115	0.87	1.124***	(6.27)
Color	1409	0.88	1294	9.72	115	4.26	5.457***	(6.21)

*p<0.05, **p<0.01, ***p<0.001

65. Point Beach Nuclear Plant, Wisconsin

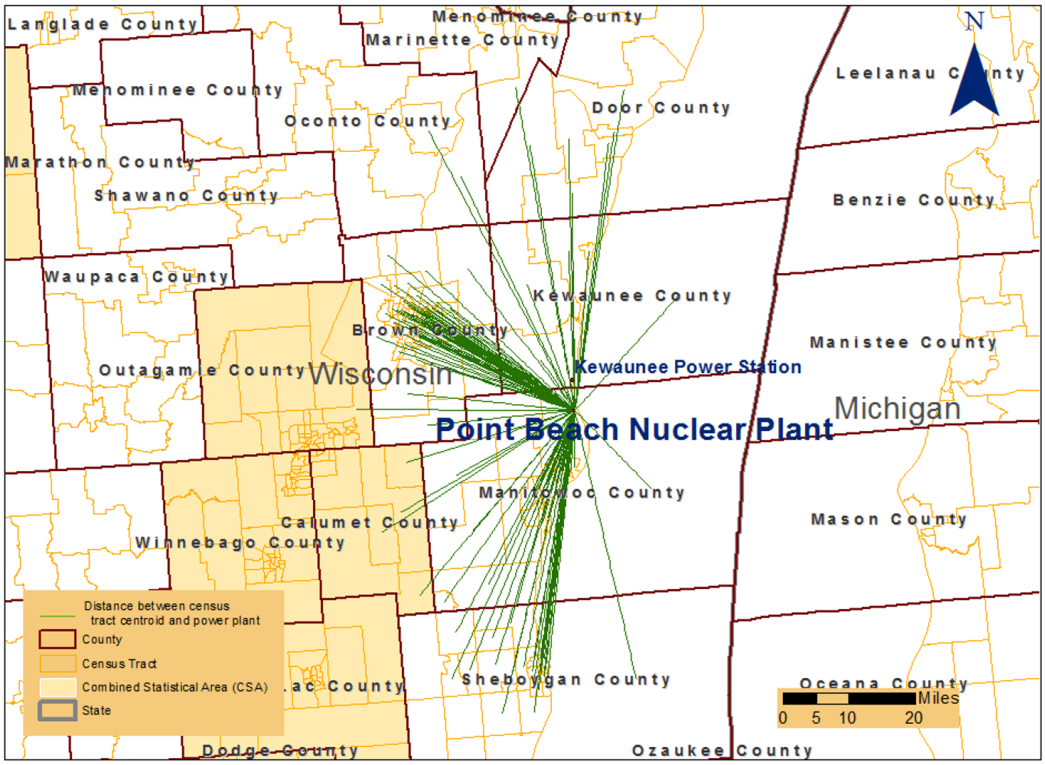

Figure B. 65 Distance to census-tract center points of census tracts within a 50-mile radius of Point Beach Nuclear Plant, Wisconsin in 1990, 2000, and 2010

Table B. 129

Demographic Composition of Population, as sorted by Distance from Point Beach Nuclear Plant, Wisconsin in 1990, 2000, and 2010

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Year 1990							
Tract	5	13	48	30	18	114	1,295
Tract area (sq. mile)	192	1,154	1,689	712	1,403	5,150	60,346
Total population	20,905	51,500	173,433	109,702	62,752	418,292	4,473,476
White	20,582	50,155	167,146	106,176	61,258	405,317	4,108,993
Black	32	75	949	215	93	1,364	242,940
Asian	139	928	2,549	1,380	714	5,710	47,350
Native American	106	256	2,313	1,617	288	4,580	35,137
Others	45	88	473	315	397	1,318	39,044
Hispanic	86	314	1,341	870	938	3,549	84,057
Color	358	1,570	7,038	3,983	1,973	14,922	407,753
White (%)	98.45	97.39	96.37	96.79	97.62	96.90	91.85
Black (%)	0.15	0.15	0.55	0.20	0.15	0.33	5.43
Asian (%)	0.66	1.80	1.47	1.26	1.14	1.37	1.06
Native American (%)	0.51	0.50	1.33	1.47	0.46	1.09	0.79
Others (%)	0.22	0.17	0.27	0.29	0.63	0.32	0.87
Hispanic (%)	0.41	0.61	0.77	0.79	1.49	0.85	1.88
Color (%)	1.71	3.05	4.06	3.63	3.14	3.57	9.11
Female (%)	50.23	51.65	51.09	50.84	50.95	51.03	51.08
Old (65 + years) (%)	15.71	17.03	12.23	11.60	15.58	13.33	13.31
Kid (< 5 years) (%)	8.89	8.55	9.36	9.31	8.65	9.12	8.93
Native-born (%)	99.15	98.05	98.40	98.08	97.86	98.23	97.45
Renter housing units (%)	21.80	27.10	32.07	28.36	23.84	28.65	29.59
Education (%)	11.08	12.78	16.20	15.88	12.64	14.87	18.01
Unemployment (%)	4.30	5.41	4.57	4.00	4.87	4.54	5.26
Poverty (%)	8.18	9.67	9.69	6.06	7.97	8.40	10.91
Mean household income ($)	53,475	51,709	57,095	64,344	53,847	57,584	57,762
Year 2000							
Total population	20,819	53,856	194,781	124,182	68,085	461,723	4,901,952
White	20,468	51,106	178,340	115,725	64,232	429,871	4,343,682
Black	2	123	2,339	603	416	3,483	296,872
Asian	103	1,276	4,066	2,924	1,470	9,839	74,815
Native American	43	387	3,205	2,213	283	6,131	43,530
Others	201	967	6,822	2,722	1,680	12,392	143,060
Hispanic	175	1,111	8,246	2,736	1,838	14,106	176,943
Color	444	3,251	19,591	9,649	4,611	37,546	638,480
White (%)	98.31	94.89	91.56	93.19	94.34	93.10	88.61
Black (%)	0.01	0.23	1.20	0.49	0.61	0.75	6.06
Asian (%)	0.49	2.37	2.09	2.35	2.16	2.13	1.53
Native American (%)	0.21	0.72	1.65	1.78	0.42	1.33	0.89
Others (%)	0.97	1.80	3.50	2.19	2.47	2.68	2.92
Hispanic (%)	0.84	2.06	4.23	2.20	2.70	3.06	3.61
Color (%)	2.13	6.04	10.06	7.77	6.77	8.13	13.03
Female (%)	49.51	51.19	50.15	50.61	50.61	50.43	50.64
Old (65 + years) (%)	16.06	16.24	11.79	11.45	15.47	12.95	13.11
Kid (< 5 years) (%)	6.40	7.20	8.14	8.24	7.00	7.81	7.71
Native-born (%)	98.84	97.06	95.73	97.09	96.56	96.51	96.38
Renter housing units (%)	18.83	25.88	32.49	27.21	24.44	28.41	28.34
College degree or higher (%)	13.40	16.27	20.25	21.36	15.58	19.04	22.74
Unemployment (%)	3.16	4.18	3.91	3.01	2.99	3.53	4.79
Poverty (%)	5.57	7.15	7.29	5.02	5.70	6.34	8.88
Mean household income ($)	61,514	61,446	65,898	72,787	63,011	66,550	67,158
Year 2010							
Total population	19,752	53,456	202,115	140,059	70,207	485,589	5,152,358
White	18,850	50,204	179,187	127,270	65,421	440,932	4,473,619
Black	279	289	3,674	1,711	709	6,662	342,000
Asian	252	1,565	5,466	3,887	2,364	13,534	110,461
Native American	129	244	3,599	3,289	255	7,516	41,673
Others	242	1,154	10,189	3,902	1,458	16,945	184,605
Hispanic	221	2,018	15,574	4,811	2,683	25,307	285,242
Color	1,071	4,608	31,504	14,984	6,438	58,605	843,917
White (%)	95.43	93.92	88.66	90.87	93.18	90.80	86.83

	0-10	11-20	21-30	31-40	41-50	0-50	Outside
Black (%)	1.41	0.54	1.82	1.22	1.01	1.37	6.64
Asian (%)	1.28	2.93	2.70	2.78	3.37	2.79	2.14
Native American (%)	0.65	0.46	1.78	2.35	0.36	1.55	0.81
Others (%)	1.23	2.16	5.04	2.79	2.08	3.49	3.58
Hispanic (%)	1.12	3.78	7.71	3.43	3.82	5.21	5.54
Color (%)	5.42	8.62	15.59	10.70	9.17	12.07	16.38
Female (%)	51.27	50.78	50.53	50.04	50.69	50.47	50.40
Old (65 + years) (%)	19.15	16.83	11.85	12.32	15.85	13.41	13.39
Kid (< 5 years) (%)	4.35	6.04	6.86	6.24	6.13	6.38	6.29
Native-born (%)	98.31	96.44	94.19	96.40	96.26	95.54	95.41
Renter housing units (%)	17.23	24.82	30.54	25.50	24.06	26.86	26.75
College degree or higher (%)	15.05	18.25	22.56	24.91	20.59	22.13	26.14
Unemployment (%)	6.47	7.90	6.28	5.42	5.99	6.17	6.70
Poverty (%)	9.06	9.16	10.86	7.53	9.51	9.43	11.83
Mean household income ($)	58,942	58,520	61,510	71,688	57,426	63,316	65,460
Index	65	65	65	65	65	65	65

Table B. 130

Two Independent-sample T-tests for Differences in Demographic Composition of Populations within a 50-mile Radius Populations in Outlying Areas surrounding Point Beach Nuclear Plant, Wisconsin

	Count	SE	N1	Mean 1	N2	Mean 2	Diff.	t
White (2010)	1409	2.08	1295	83.73	114	85.80	-2.072	(-1.00)
Black	1409	0.73	1295	8.51	114	1.81	6.699***	(9.19)
Asian	1409	0.33	1295	2.12	114	2.70	-0.582	(-1.74)
Native American	1409	0.33	1295	0.97	114	1.66	-0.683*	(-2.07)
Others	1409	0.52	1295	3.74	114	3.64	0.0972	(0.19)
Hispanic	1409	0.86	1295	5.79	114	5.52	0.272	(0.32)
Color	1409	1.45	1295	18.65	114	12.88	5.768***	(3.99)
White (2000)	1409	1.90	1295	86.18	114	89.31	-3.126	(-1.64)
Black	1409	0.65	1295	7.52	114	0.94	6.584***	(10.13)
Asian	1409	0.32	1295	1.60	114	2.15	-0.545	(-1.69)
Native American	1409	0.25	1295	1.03	114	1.47	-0.436	(-1.76)
Others	1409	0.37	1295	3.15	114	2.80	0.352	(0.96)
Hispanic	1409	0.48	1295	3.86	114	3.16	0.698	(1.45)
Color	1409	1.12	1295	14.90	114	8.50	6.406***	(5.72)
White (1990)	1409	1.86	1295	90.64	114	92.98	-2.345	(-1.26)
Black	1409	0.63	1295	5.89	114	0.62	5.278***	(8.44)
Asian	1409	0.25	1295	1.06	114	1.44	-0.376	(-1.53)
Native American	1409	0.25	1295	0.99	114	1.20	-0.218	(-0.86)
Others	1409	0.11	1295	0.96	114	0.34	0.620***	(5.41)
Hispanic	1409	0.18	1295	1.99	114	0.87	1.115***	(6.20)
Color	1409	0.84	1295	9.74	114	3.97	5.765***	(6.89)

*p<0.05, **p<0.01, ***p<0.001

APPENDIX C

ORDINARY LEAST SQUARE (OLS) AND SPATIAL AUTOCORRELATION REGRESSION (SAR) ANALYSIS FOR INDIVIDUAL PLANTS

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1. Browns Ferry Nuclear Plant, Alabama

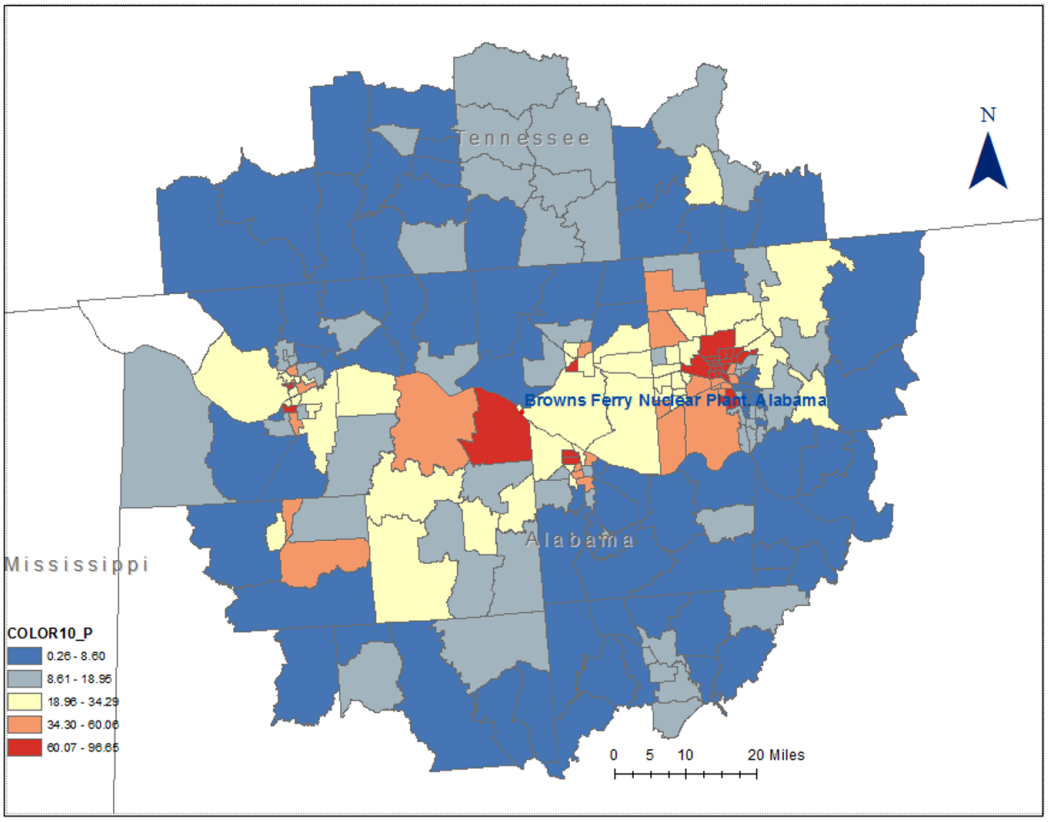

Figure C. 1 Spatial distribution of percent Color among the populations surrounding Browns Ferry nuclear power plant

Table C. 1

Descriptive Statistics for Study Variables at Brown Ferry

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.285	0.456	1.473	3.906
Black (%)	15.435	21.370	0.000	96.651
Asian (%)	1.109	1.742	0.000	9.244
Hispanic (%)	4.143	6.196	0.000	39.165
Color (%)	23.003	23.504	0.264	96.651
Population Density (LN)	5.715	1.605	2.310	8.606
Below Poverty (%)	16.289	10.842	0.000	64.144
Owner Occupied Units (%)	63.915	18.373	0.000	95.288
Observations	223			

Index 1

Table C. 2

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Brown Ferry

	rho	p	count
Black (%)	-0.2266	0.0006	223
Asian (%)	-0.0689	0.3059	223
Hispanic (%)	-0.2359	0.0004	223
Color (%)	-0.2848	0.0000	223
Population Density (LN)	-0.2532	0.0001	223
Below Poverty (%)	0.0835	0.2143	223
Owner Occupied Units (%)	0.0180	0.7893	223

Table C. 3

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Brown Ferry

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0029+	-0.0062***
			(-1.860)	(-3.637)
Asian (%)			-0.0065	0.0088
			(-0.360)	(0.486)
Hispanic (%)			-0.0130**	-0.0189***
			(-2.604)	(-3.707)
Color (%)	-0.0041**	-0.0071***		
	(-2.781)	(-4.342)		
Population Density (LN)	-0.0406+	-0.0319	-0.0361	-0.0315
	(-1.895)	(-1.490)	(-1.570)	(-1.407)
Below Poverty (%)		0.0102**		0.0110**
		(2.845)		(2.941)
Owner Occupied Units (%)		-0.0013		-0.0020
		(-0.614)		(-0.914)
Constant	3.6109***	3.5500***	3.5971***	3.5779***
	(32.098)	(15.424)	(31.154)	(15.396)
Observations	223	223	223	223
R-squared	0.096	0.152	0.106	0.173
F	11.6658	9.7925	6.4844	7.5297
Log-likelihood	-129.8119	-122.6263	-128.5163	-119.8742
Akaike Info Coefficient	265.6237	255.2527	267.0325	253.7485
Moran's I-Queen	0.884***	0.877***	0.864***	0.841***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 4

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Brown Ferry

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0006*	-0.0010**
			(-2.042)	(-3.016)
Asian (%)			-0.0007	0.0016
			(-0.211)	(0.458)
Hispanic (%)			-0.0001	-0.0007
			(-0.105)	(-0.701)
Color (%)	-0.0006*	-0.0010**		
	(-2.215)	(-3.222)		
Population Density (LN)	-0.0015	-0.0000	-0.0020	-0.0011
	(-0.366)	(-0.012)	(-0.450)	(-0.247)
Below Poverty (%)		0.0016*		0.0017*
		(2.236)		(2.316)
Owner Occupied Units (%)		-0.0000		0.0001
		(-0.085)		(0.120)
Constant	0.0477+	0.0284	0.0463+	0.0186
	(1.720)	(0.579)	(1.657)	(0.375)
Spatial Autoregressive Coefficient (Rho)	0.9946***	0.9937***	0.9948***	0.9939***
	(206.297)	(184.190)	(212.296)	(187.755)
Observations	223	223	223	223
R-squared	0.966	0.967	0.966	0.967
Log-likelihood Queen	193.82	197.43	193.47	196.98
Akaike Info Coefficient	-379.648	-382.842	-374.938	-377.97
Moran's I-Queen	0.261***	0.257***	0.257***	0.251***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

2. Joseph M. Farley Nuclear Plant, Alabama

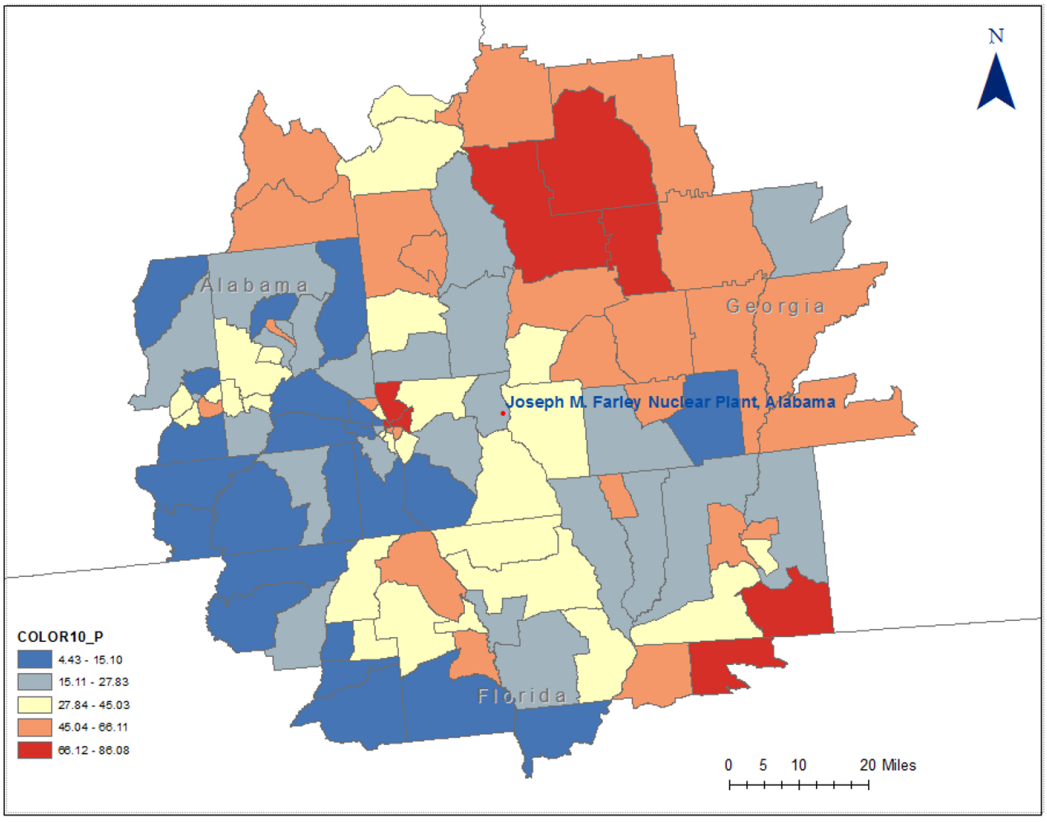

Figure C. 2 Spatial distribution of percent Color among the populations surrounding Joseph M. Farley Nuclear Power Plant

Table C. 5

Descriptive Statistics for Study Variables at Joseph M. Farley

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.338	0.505	1.042	3.910
Black (%)	30.131	20.661	0.000	81.344
Asian (%)	0.663	1.132	0.000	8.311
Hispanic (%)	3.289	3.738	0.000	17.532
Color (%)	35.666	20.653	4.426	86.079
Population Density (LN)	4.456	1.538	2.073	7.968
Below Poverty (%)	20.285	9.686	3.931	47.622
Owner Occupied Units (%)	58.052	13.275	1.585	81.413
Observations	110			

Table C. 6

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Joseph M. Farley

	rho	p	count
Black (%)	-0.0861	0.3713	110
Asian (%)	0.0209	0.8287	110
Hispanic (%)	0.2274	0.0169	110
Color (%)	-0.0377	0.6959	110
Population Density (LN)	-0.1745	0.0682	110
Below Poverty (%)	0.0337	0.7264	110
Owner Occupied Units (%)	0.0326	0.7354	110

Table C. 7

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Joseph M. Farley

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0021	-0.0083*
			(-0.911)	(-2.278)
Asian (%)			0.0188	0.0369
			(0.426)	(0.817)
Hispanic (%)			0.0379**	0.0385**
			(2.939)	(2.995)
Color (%)	-0.0007	-0.0039		
	(-0.287)	(-1.045)		
Population Density (LN)	-0.0568+	-0.0652+	-0.0845*	-0.0972**
	(-1.814)	(-1.869)	(-2.593)	(-2.797)
Below Poverty (%)		0.0066		0.0167*
		(0.878)		(2.158)
Owner Occupied Units (%)		-0.0028		-0.0010
		(-0.597)		(-0.223)
Constant	3.6153***	3.7988***	3.6397***	3.5920***
	(21.890)	(8.622)	(22.923)	(8.509)
Observations	110	110	110	110
R-squared	0.031	0.043	0.117	0.158
F	1.7233	1.1669	3.4701	3.2097
Log-likelihood	-78.7040	-78.0554	-73.6190	-71.0203
Akaike Info Coefficient	163.4079	166.1109	157.2380	156.0407
Moran's I-Queen	0.7855***	0.7795***	0.6899***	0.6534***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 8

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Joseph M. Farley

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0002	-0.0012
			(-0.233)	(-1.008)
Asian (%)			0.0007	0.0035
			(0.047)	(0.240)
Hispanic (%)			0.0015	0.0016
			(0.352)	(0.380)
Color (%)	-0.0001	-0.0008		
	(-0.077)	(-0.684)		
Population Density (LN)	-0.0085	-0.0093	-0.0096	-0.0120
	(-0.868)	(-0.860)	(-0.909)	(-1.047)
Below Poverty (%)		0.0018		0.0027
		(0.777)		(1.068)
Owner Occupied Units (%)		-0.0003		-0.0002
		(-0.209)		(-0.150)
Constant	0.1116	0.1237	0.1177	0.1198
	(1.484)	(0.834)	(1.521)	(0.797)
Spatial Autoregressive Coefficient (Rho)	0.9814***	0.9811***	0.9805***	0.9791***
	(63.737)	(62.907)	(60.813)	(57.679)
Observations	110	110	110	110
R-squared	0.9036	0.904	0.9035	0.9043
Log-likelihood Queen	27.8276	28.1695	27.9190	28.5405
Akaike Info Coefficient	-47.65	-44.34	-43.84	-41.08
Moran's I-Queen	0.1554***	0.1485***	0.1499***	0.1331***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

3. Palo Verde Nuclear Generating Station, Arizona

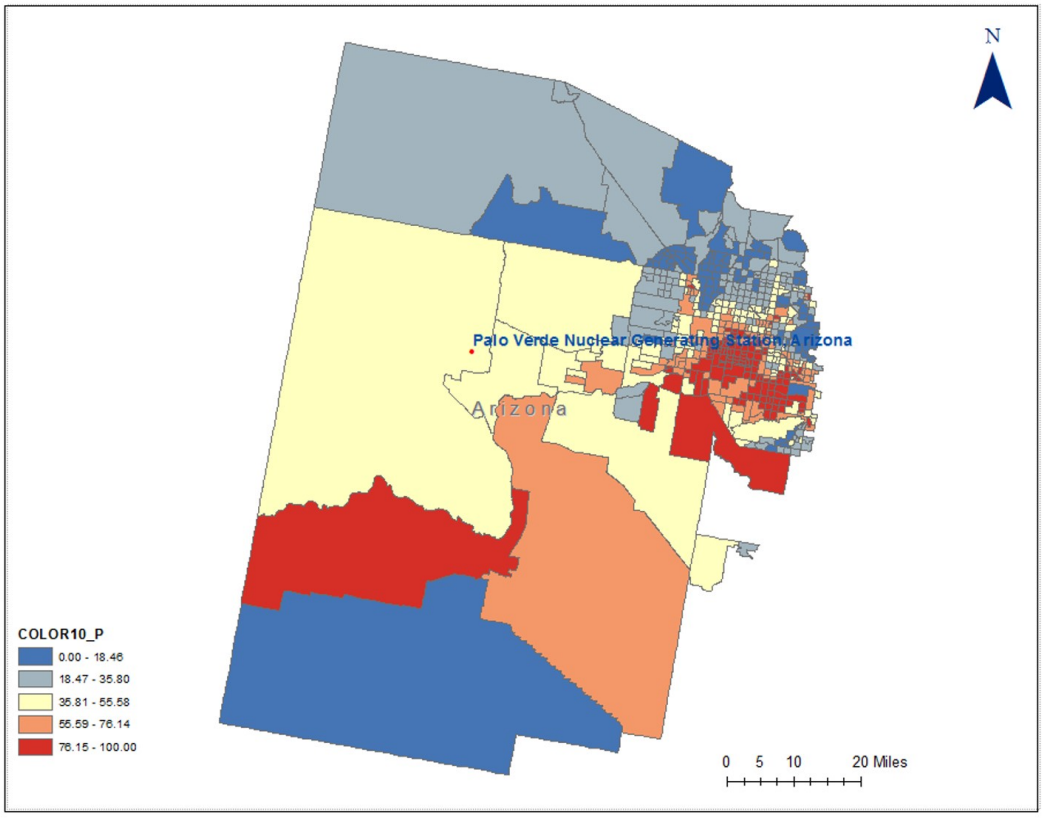

Figure C. 3 Spatial distribution of percent Color among the populations surrounding Palo Verde Nuclear Generating Station

Table C. 9

Descriptive Statistics for Study Variables at Palo Verde Nuclear Generating Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.664	0.220	1.716	3.912
Black (%)	6.141	6.535	0.000	55.172
Asian (%)	3.090	3.783	0.000	42.478
Hispanic (%)	36.437	26.076	0.000	95.415
Color (%)	48.738	27.348	0.000	100.000
Population Density (LN)	8.030	1.390	0.000	10.012
Below Poverty (%)	17.621	14.878	0.000	80.769
Owner Occupied Units (%)	55.686	21.878	0.000	100.000
Observations	534			

Table C. 10

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Palo Verde Nuclear Generating Station

	rho	p	count
Black (%)	-0.0038	0.9299	534
Asian (%)	0.1048	0.0154	534
Hispanic (%)	-0.0514	0.2353	534
Color (%)	-0.0169	0.6974	534
Population Density (LN)	0.3564	0.0000	534
Below Poverty (%)	0.1610	0.0002	534
Owner Occupied Units (%)	-0.2192	0.0000	534

Table C. 11

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Palo Verde Nuclear Generating Station

Index_3

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0006	-0.0013
			(0.447)	(-0.941)
Asian (%)			0.0045+	0.0052*
			(1.862)	(2.221)
Hispanic (%)			-0.0012**	-0.0031***
			(-3.131)	(-6.666)
Color (%)	-0.0008*	-0.0025***		
	(-2.421)	(-5.705)		
Population Density (LN)	0.0598***	0.0555***	0.0623***	0.0588***
	(9.153)	(8.751)	(9.501)	(9.307)
Below Poverty (%)		0.0033***		0.0044***
		(3.604)		(4.805)
Owner Occupied Units (%)		-0.0015**		-0.0011*
		(-3.047)		(-2.213)
Constant	3.2230***	3.3664***	3.1878***	3.2778***
	(61.847)	(52.488)	(60.375)	(50.060)
Observations	534	534	534	534
R-squared	0.137	0.199	0.156	0.233
F	41.9779	32.9271	24.3818	26.6142
Log-likelihood	91.5054	111.6733	97.4902	122.9812
Akaike Info Coefficient	-177.0108	-213.3467	-184.9805	-231.9624
Moran's I-Queen	0.7615***	0.7159***	0.7476***	0.6826***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 12

Results from spatial regression analysis for distance mile (Natural Logarithm) at Palo Verde Nuclear Generating Station

Index_3 Lag

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0000	-0.0003
			(-0.100)	(-0.504)
Asian (%)			0.0002	0.0004
			(0.239)	(0.503)
Hispanic (%)			-0.0001	-0.0004*
			(-0.740)	(-2.452)
Color (%)	-0.0001	-0.0004*		
	(-0.582)	(-2.235)		
Population Density (LN)	0.0014	0.0014	0.0017	0.0020
	(0.587)	(0.560)	(0.676)	(0.777)
Below Poverty (%)		0.0008*		0.0009**
		(2.398)		(2.687)
Owner Occupied Units (%)		0.0000		0.0001
		(0.174)		(0.398)
Constant	0.1391**	0.1562**	0.1403**	0.1555**
	(3.097)	(3.063)	(3.104)	(3.010)
Spatial Autoregressive Coefficient (Rho)	0.9601***	0.9552***	0.9591***	0.9522***
	(75.522)	(71.199)	(74.405)	(68.843)
Observations	534	534	534	534
R-squared	0.8878	0.8886	0.8879	0.8876
Log-likelihood Queen	567.6624	571.0475	567.8952	572.0782
Akaike Info Coefficient	-1127.32	-1130.09	-1123.78	-1128.15
Moran's I-Queen	0.1147***	0.121***	0.1148***	0.1218***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

4. Arkansas Nuclear One, Arkansas

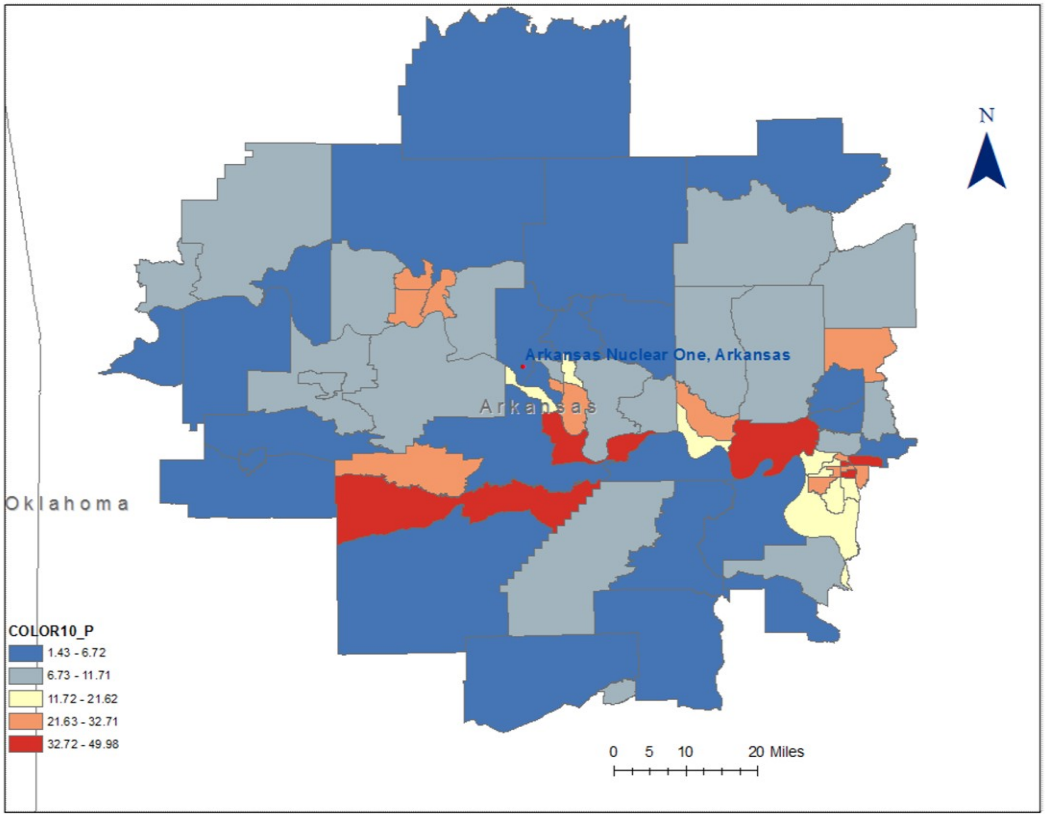

Figure C. 4 Spatial distribution of percent Color among the populations surrounding Arkansas Nuclear One

Table C. 13

Descriptive Statistics for Study Variables at Arkansas Nuclear One

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.279	0.710	1.241	3.909
Black (%)	5.713	8.249	0.000	31.409
Asian (%)	0.838	1.264	0.000	5.514
Hispanic (%)	5.565	7.259	0.000	34.459
Color (%)	14.461	11.496	1.432	49.984
Population Density (LN)	4.646	1.683	1.822	8.413
Below Poverty (%)	17.381	7.901	2.558	45.416
Owner Occupied Units (%)	61.592	14.235	16.413	92.768
Observations	72			

Table C. 14

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Arkansas Nuclear One

	rho	p	count
Black (%)	0.2626	0.0259	72
Asian (%)	-0.0378	0.7528	72
Hispanic (%)	-0.3062	0.0089	72
Color (%)	0.0055	0.9632	72
Population Density (LN)	-0.0586	0.6246	72
Below Poverty (%)	-0.0155	0.8969	72
Owner Occupied Units (%)	0.0489	0.6836	72
Observations	72		

Table C. 15

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Arkansas Nuclear One

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0359**	0.0384**
			(3.205)	(3.097)
Asian (%)			-0.0079	-0.0072
			(-0.127)	(-0.114)
Hispanic (%)			-0.0290**	-0.0267*
			(-2.707)	(-2.279)
Color (%)	0.0030	0.0053		
	(0.346)	(0.506)		
Population Density (LN)	-0.0352	-0.0300	-0.1039+	-0.1009+
	(-0.597)	(-0.479)	(-1.848)	(-1.695)
Below Poverty (%)		0.0009		-0.0016
		(0.058)		(-0.107)
Owner Occupied Units (%)		0.0040		0.0029
		(0.394)		(0.317)
Constant	3.3994***	3.0822**	3.7244***	3.5339***
	(13.558)	(3.179)	(15.506)	(4.026)
Observations	72	72	72	72
R-squared	0.005	0.008	0.215	0.218
F	0.1790	0.1411	4.5893	3.0247
Log-likelihood	-76.8443	-76.7285	-68.3131	-68.1660
Akaike Info Coefficient	159.6885	163.4571	146.6262	150.3319
Moran's I-Queen	0.8363***	0.8306***	0.6675***	0.6620***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 16

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Arkansas Nuclear One

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0064+	0.0053
			(1.859)	(1.425)
Asian (%)			0.0045	0.0050
			(0.242)	(0.272)
Hispanic (%)			-0.0048	-0.0056
			(-1.477)	(-1.606)
Color (%)	0.0012	0.0004		
	(0.521)	(0.132)		
Population Density (LN)	-0.0362*	-0.0329+	-0.0468**	-0.0441*
	(-2.217)	(-1.935)	(-2.779)	(-2.527)
Below Poverty (%)		0.0039		0.0037
		(0.876)		(0.856)
Owner Occupied Units (%)		0.0010		0.0007
		(0.353)		(0.262)
Constant	0.2418**	0.1102	0.3253**	0.2110
	(2.663)	(0.411)	(3.000)	(0.787)
Spatial Autoregressive Coefficient (Rho)	0.9779***	0.9787***	0.9689***	0.9704***
	(53.785)	(55.103)	(41.777)	(43.110)
Observations	72	72	72	72
R-squared	0.9208	0.9219	0.9248	0.9259
Log-likelihood Queen	0.1781	0.5909	2.8323	3.2658
Akaike Info Coefficient	7.64	10.82	6.33	9.47
Moran's I-Queen	0.1556*	0.1395*	0.1176*	0.1025

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

5. Diablo Canyon Nuclear Power Plant, California

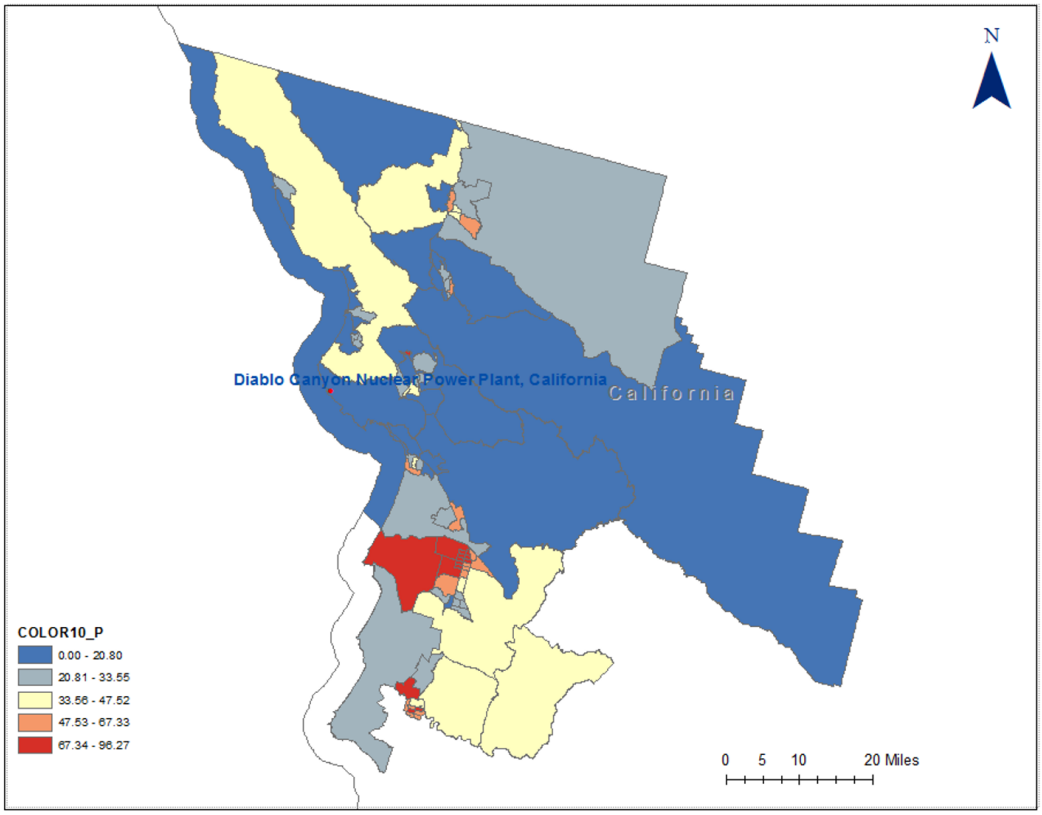

Figure C. 5 Spatial distribution of percent Color among the populations surrounding Diablo Canyon Nuclear Power Plant

Table C. 17

Descriptive Statistics for Study Variables at Diablo Canyon Nuclear Power Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.123	0.573	0.923	3.898
Black (%)	2.393	4.722	0.000	33.551
Asian (%)	3.766	2.938	0.000	12.604
Hispanic (%)	31.577	23.646	0.000	92.032
Color (%)	39.859	24.336	0.000	96.270
Population Density (LN)	6.982	2.122	0.000	9.665
Below Poverty (%)	14.084	14.300	0.000	80.308
Owner Occupied Units (%)	51.115	22.979	0.000	83.559
Observations	92			

Table C. 18

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Diablo Canyon Nuclear Power Plant

	rho	p	count
Black (%)	0.1048	0.3203	92
Asian (%)	-0.0488	0.6441	92
Hispanic (%)	0.4450	0.0000	92
Color (%)	0.4408	0.0000	92
Population Density (LN)	0.0636	0.5468	92
Below Poverty (%)	-0.1219	0.2469	92
Owner Occupied Units (%)	0.2247	0.0313	92

Table C. 19

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Diablo Canyon Nuclear Power Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0101	0.0278*
			(0.860)	(2.412)
Asian (%)			-0.0132	-0.0160
			(-0.689)	(-0.900)
Hispanic (%)			0.0123***	0.0140***
			(4.876)	(5.978)
Color (%)	0.0125***	0.0148***		
	(4.986)	(6.201)		
Population Density (LN)	-0.0505+	-0.0467+	-0.0403	-0.0403
	(-1.764)	(-1.710)	(-1.364)	(-1.454)
Below Poverty (%)		0.0011		0.0029
		(0.241)		(0.642)
Owner Occupied Units (%)		0.0097***		0.0111***
		(3.549)		(3.870)
Constant	2.9787***	2.3523***	3.0420***	2.3456***
	(16.178)	(9.573)	(16.276)	(9.444)
Observations	92	92	92	92
R-squared	0.222	0.349	0.228	0.367
F	12.6639	11.6762	6.4226	8.2256
Log-likelihood	-67.2263	-58.9789	-66.8444	-57.6865
Akaike Info Coefficient	140.4527	127.9578	143.6889	129.3729
Moran's I-Queen	0.5845***	0.5501***	0.5766***	0.4883***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 20

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Diablo Canyon Nuclear Power Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0044	0.0037
			(-0.642)	(0.509)
Asian (%)			-0.0058	-0.0079
			(-0.522)	(-0.720)
Hispanic (%)			0.0031+	0.0043**
			(1.911)	(2.604)
Color (%)	0.0028+	0.0043*		
	(1.720)	(2.560)		
Population Density (LN)	-0.0094	-0.0114	-0.0042	-0.0074
	(-0.550)	(-0.669)	(-0.246)	(-0.430)
Below Poverty (%)		0.0015		0.0020
		(0.552)		(0.714)
Owner Occupied Units (%)		0.0046**		0.0047*
		(2.654)		(2.556)
Constant	0.5975**	0.4250+	0.5996**	0.4470*
	(2.906)	(1.938)	(2.883)	(2.023)
Spatial Autoregressive Coefficient (Rho)	0.7957***	0.7543***	0.7987***	0.7522***
	(13.596)	(12.085)	(13.720)	(11.853)
Observations	92	92	92	92
R-squared	0.7246	0.7415	0.7294	0.7429
Log-likelihood Queen	-27.2030	-23.1868	-26.4969	-22.8859
Akaike Info Coefficient	62.41	58.37	64.99	61.77
Moran's I-Queen	0.1556*	0.1395*	0.1176*	0.1025

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

6. San Onofre Nuclear Generating Station, California

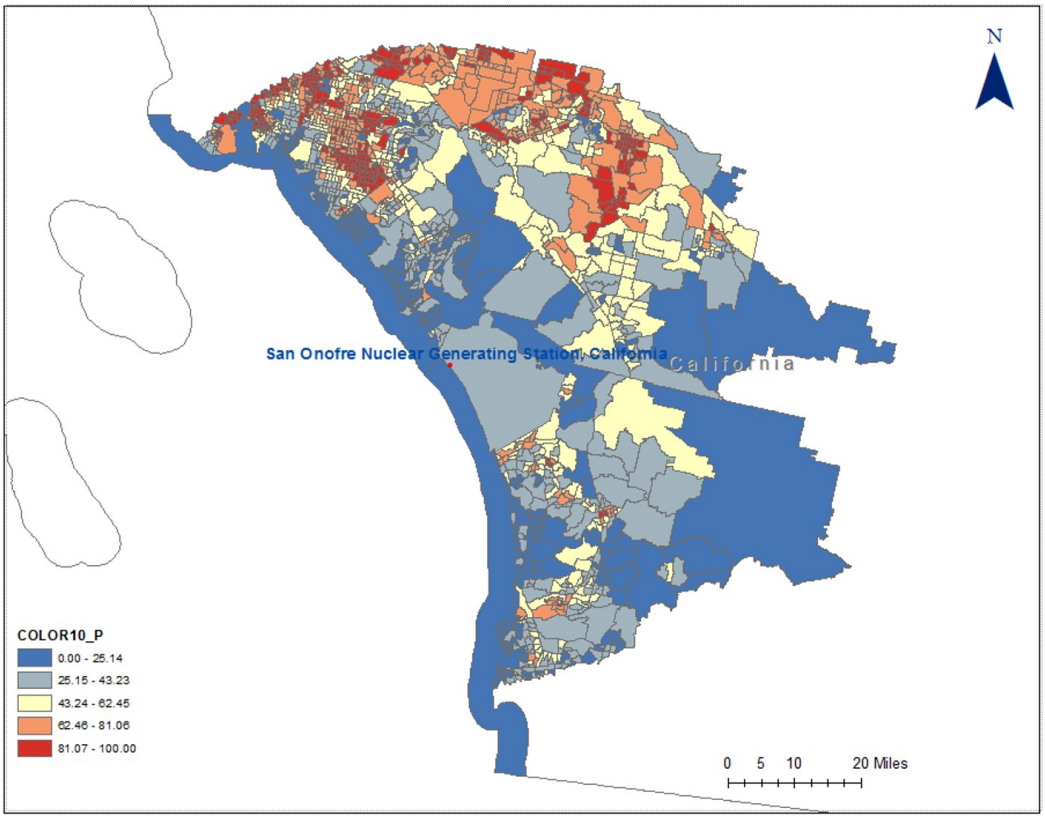

Figure C. 6 Spatial distribution of percent Color among the populations surrounding San Onofre Nuclear Generating Station

Table C. 21

Descriptive Statistics for Study Variables at San Onofre Nuclear Generating Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.561	0.354	1.336	3.912
Black (%)	4.164	5.679	0.000	56.189
Asian (%)	13.452	14.043	0.000	79.316
Hispanic (%)	34.347	24.425	0.000	99.678
Color (%)	54.383	25.580	0.000	100.000
Population Density (LN)	8.411	1.331	0.000	10.791
Below Poverty (%)	10.970	9.459	0.000	100.000
Owner Occupied Units (%)	58.355	23.375	0.000	97.171
Observations	1588			

Table C. 22

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at San Onofre Nuclear Generating Station

	rho	p	count
Black (%)	0.2758	0.0000	1588
Asian (%)	0.1433	0.0000	1588
Hispanic (%)	0.2394	0.0000	1588
Color (%)	0.3607	0.0000	1588
Population Density (LN)	0.1236	0.0000	1588
Below Poverty (%)	0.1555	0.0000	1588
Owner Occupied Units (%)	-0.1029	0.0000	1588

Table C. 23

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at San Onofre Nuclear Generating Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0151***	0.0153***
			(10.321)	(10.246)
Asian (%)			0.0059***	0.0060***
			(9.414)	(9.470)
Hispanic (%)			0.0040***	0.0042***
			(10.590)	(9.901)
Color (%)	0.0052***	0.0054***		
	(14.548)	(13.568)		
Population Density (LN)	-0.0100	-0.0094	-0.0120+	-0.0114+
	(-1.454)	(-1.364)	(-1.760)	(-1.666)
Below Poverty (%)		-0.0016		-0.0014
		(-1.361)		(-1.193)
Owner Occupied Units (%)		-0.0004		-0.0003
		(-0.944)		(-0.698)
Constant	3.3615***	3.3885***	3.3801***	3.4001***
	(63.127)	(54.474)	(64.333)	(55.311)
Observations	1588	1588	1588	1588
R-squared	0.131	0.132	0.162	0.163
F	119.7659	60.3603	76.3693	51.1336
Log-likelihood	-491.2075	-490.2444	-462.8537	-462.1340
Akaike Info Coefficient	988.4150	990.4888	935.7075	938.2680
Moran's I-Queen	0.9330***	0.9313***	0.9194***	0.9180***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 24

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at San Onofre Nuclear Generating Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0000	0.0001
			(0.189)	(0.296)
Asian (%)			0.0001	0.0001
			(0.951)	(0.845)
Hispanic (%)			0.0001*	0.0001+
			(2.147)	(1.864)
Color (%)	0.0001*	0.0001+		
	(2.007)	(1.728)		
Population Density (LN)	-0.0023**	-0.0023**	-0.0024**	-0.0023**
	(-2.830)	(-2.830)	(-2.868)	(-2.835)
Below Poverty (%)		0.0001		0.0001
		(0.916)		(0.737)
Owner Occupied Units (%)		0.0001		0.0001
		(1.527)		(1.489)
Constant	0.0279**	0.0219*	0.0283**	0.0225*
	(3.184)	(2.298)	(3.217)	(2.339)
Spatial Autoregressive Coefficient (Rho)	0.9965***	0.9966***	0.9966***	0.9966***
	(548.172)	(552.640)	(547.336)	(550.723)
Observations	1588	1588	1588	1588
R-squared	0.9878	0.9879	0.9878	0.9879
Log-likelihood Queen	2632.0233	2633.1959	2632.3952	2633.5028
Akaike Info Coefficient	-5256.32	-5254.68	-5253.07	-5251.29
Moran's I-Queen	0.1253***	0.1251***	0.1257***	0.1254***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

7. Millstone Power Station, Connecticut

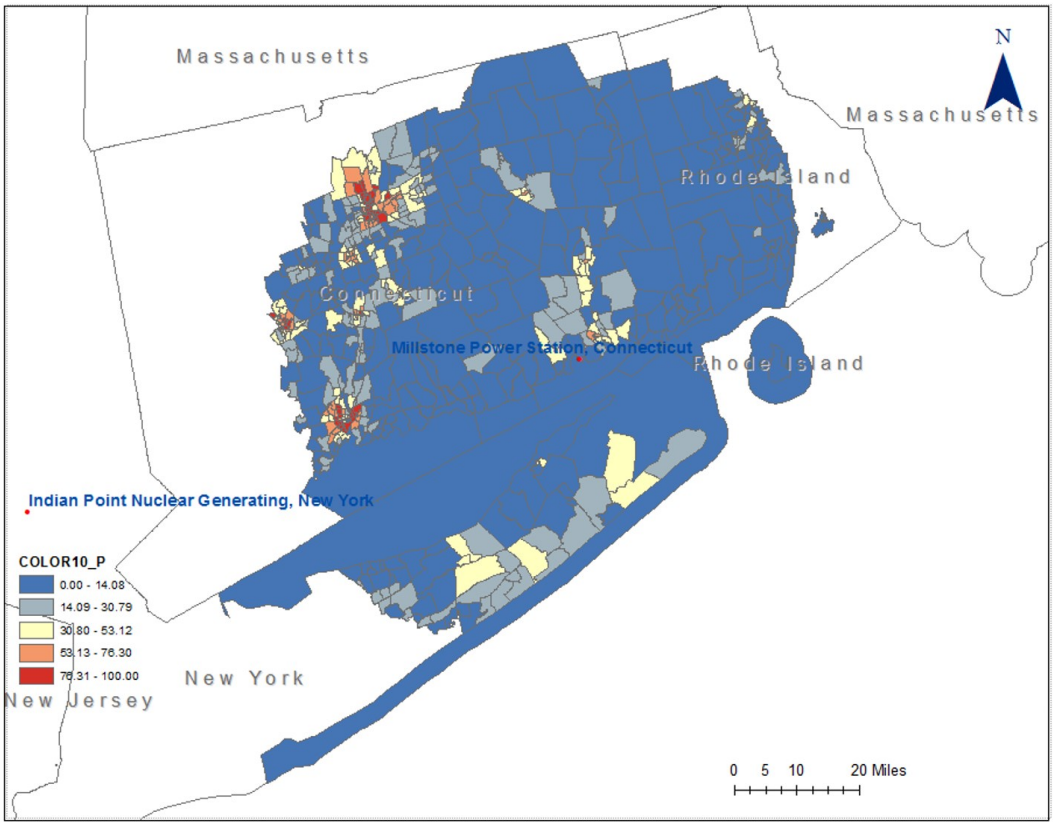

Figure C. 7 Spatial distribution of percent Color among the populations surrounding Millstone Power Station

Table C. 25

Descriptive Statistics for Study Variables at Millstone Power Station

	mean	sd	min	max
Distance from Nuclear Power Plant (Natural Log)	3.484	0.528	0.507	3.911
Black (%)	9.730	15.702	0.000	95.661
Asian (%)	3.218	4.005	0.000	25.101
Hispanic (%)	12.829	16.098	0.000	80.711
Color (%)	27.322	26.492	0.000	100.000
Population Density (LN)	7.222	1.525	0.000	10.483
Below Poverty (%)	11.100	12.483	0.000	67.848
Owner Occupied Units (%)	59.645	26.271	0.000	100.000
Observations	642			

Table C. 26

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Millstone Power Station

	rho	p	count
Black (%)	0.1468	0.0002	642
Asian (%)	0.0008	0.9838	642
Hispanic (%)	0.1153	0.0034	642
Color (%)	0.1486	0.0002	642
Population Density (LN)	0.2668	0.0000	642
Below Poverty (%)	0.1290	0.0010	642
Owner Occupied Units (%)	0.0331	0.4021	642

Table C. 27

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Millstone Power Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0012	0.0027+
			(0.823)	(1.771)
Asian (%)			-0.0069	-0.0033
			(-1.332)	(-0.629)
Hispanic (%)			-0.0018	0.0006
			(-1.163)	(0.322)
Color (%)	-0.0005	0.0014		
	(-0.556)	(1.086)		
Population Density (LN)	0.0982***	0.0829***	0.0997***	0.0838***
	(5.840)	(4.763)	(5.880)	(4.756)
Below Poverty (%)		0.0050+		0.0047
		(1.782)		(1.608)
Owner Occupied Units (%)		0.0048***		0.0048***
		(4.222)		(4.188)
Constant	2.7900***	2.5041***	2.7978***	2.5146***
	(25.612)	(19.655)	(25.582)	(19.725)
Observations	642	642	642	642
R-squared	0.072	0.097	0.076	0.101
F	24.6489	17.1349	13.0606	11.8850
Log-likelihood	-476.4664	-467.5182	-475.0198	-466.1584
Akaike Info Coefficient	958.9328	945.0364	960.0396	946.3169
Moran's I-Queen	0.9262***	0.9086***	0.9226***	0.9058***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 28

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Millstone Power Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0003	-0.0002
			(-1.359)	(-0.860)
Asian (%)			-0.0012	-0.0009
			(-1.368)	(-1.070)
Hispanic (%)			-0.0002	-0.0001
			(-0.876)	(-0.158)
Color (%)	-0.0003+	-0.0002		
	(-1.799)	(-0.879)		
Population Density (LN)	0.0066*	0.0055+	0.0069*	0.0059+
	(2.330)	(1.856)	(2.387)	(1.955)
Below Poverty (%)		0.0004		0.0003
		(0.953)		(0.627)
Owner Occupied Units (%)		0.0003+		0.0003+
		(1.758)		(1.706)
Constant	0.0322	0.0155	0.0326	0.0157
	(1.392)	(0.612)	(1.404)	(0.619)
Spatial Autoregressive Coefficient (Rho)	0.9819***	0.9809***	0.9819***	0.9809***
	(193.337)	(188.370)	(193.177)	(188.258)
Observations	642	642	642	642
R-squared	0.9740	0.9740	0.9740	0.9741
Log-likelihood Queen	561.8520	563.3994	562.4020	563.8850
Akaike Info Coefficient	-1115.67	-1114.77	-1112.77	-1111.74
Moran's I-Queen	0.0193	0.0176	0.0206	0.0181

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

8. Crystal River Nuclear Generating Plant, Florida

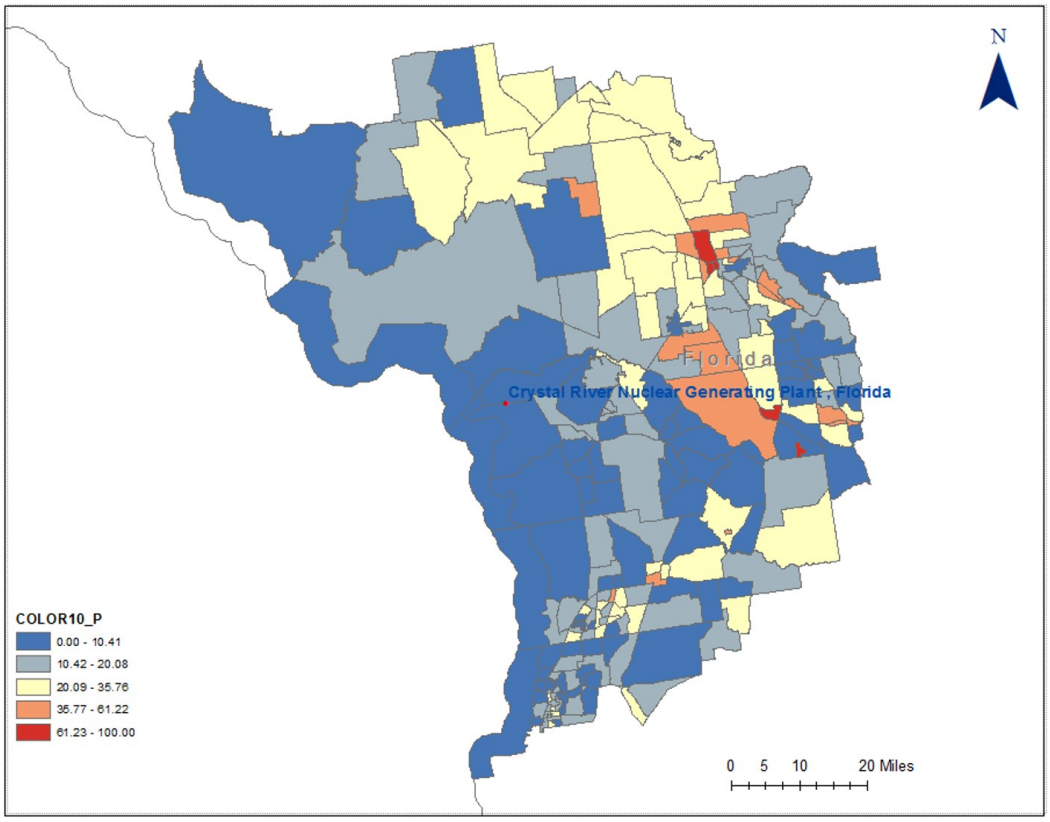

Figure C. 8 Spatial distribution of percent Color among the populations surrounding Crystal River Nuclear Generating Plant

Table C. 29

Descriptive Statistics for Study Variables at Crystal River Nuclear Generating Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.537	0.395	1.623	3.911
Black (%)	7.949	13.202	0.000	100.000
Asian (%)	1.245	1.562	0.000	8.273
Hispanic (%)	7.633	6.351	0.000	35.956
Color (%)	18.200	15.841	0.000	100.000
Population Density (LN)	6.057	1.642	0.000	8.899
Below Poverty (%)	14.136	8.089	0.000	56.644
Owner Occupied Units (%)	63.450	15.930	0.000	96.538
Observations	225			

Table C. 30

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Crystal River Nuclear Generating Plant

	rho	p	count
Black (%)	0.1068	0.1103	225
Asian (%)	0.0532	0.4272	225
Hispanic (%)	0.1231	0.0654	225
Color (%)	0.1501	0.0243	225
Population Density (LN)	0.2442	0.0002	225
Below Poverty (%)	0.0223	0.7396	225
Owner Occupied Units (%)	0.0153	0.8192	225

Table C. 31

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Crystal River Nuclear Generating Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0026	0.0035
			(1.333)	(1.521)
Asian (%)			0.0002	-0.0004
			(0.012)	(-0.023)
Hispanic (%)			0.0027	0.0030
			(0.633)	(0.685)
Color (%)	0.0028+	0.0035+		
	(1.680)	(1.807)		
Population Density (LN)	0.0541***	0.0543**	0.0548**	0.0559**
	(3.420)	(3.285)	(3.295)	(3.212)
Below Poverty (%)		-0.0032		-0.0032
		(-0.872)		(-0.850)
Owner Occupied Units (%)		-0.0001		-0.0001
		(-0.037)		(-0.072)
Constant	3.1591***	3.1932***	3.1631***	3.2011***
	(32.072)	(21.599)	(32.020)	(21.564)
Observations	225	225	225	225
R-squared	0.071	0.075	0.070	0.073
F	8.5416	4.4404	4.1645	2.8817
Log-likelihood	-101.5292	-101.1348	-101.6582	-101.2827
Akaike Info Coefficient	209.0584	212.2695	213.3164	216.5654
Moran's I-Queen	0.8454***	0.8452***	0.8456***	0.8457***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 32

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Crystal River Nuclear Generating Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0002	0.0003
			(0.387)	(0.410)
Asian (%)			0.0007	0.0002
			(0.152)	(0.052)
Hispanic (%)			-0.0002	-0.0004
			(-0.134)	(-0.329)
Color (%)	0.0002	0.0002		
	(0.412)	(0.333)		
Population Density (LN)	-0.0038	-0.0017	-0.0036	-0.0011
	(-0.866)	(-0.368)	(-0.775)	(-0.222)
Below Poverty (%)		-0.0013		-0.0013
		(-1.279)		(-1.273)
Owner Occupied Units (%)		-0.0008+		-0.0008+
		(-1.686)		(-1.744)
Constant	0.1217*	0.1766**	0.1216*	0.1779**
	(2.469)	(3.108)	(2.472)	(3.136)
Spatial Autoregressive Coefficient (Rho)	0.9735***	0.9741***	0.9736***	0.9743***
	(73.595)	(74.661)	(73.801)	(74.935)
Observations	225	225	225	225
R-squared	0.9297	0.9310	0.9297	0.9310
Log-likelihood Queen	152.4979	154.4078	152.4996	154.4825
Akaike Info Coefficient	-296.99	-296.82	-292.99	-292.96
Moran's I-Queen	0.696*	0.0908*	0.071*	0.0943*

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

9. St. Lucie Plant, Florida

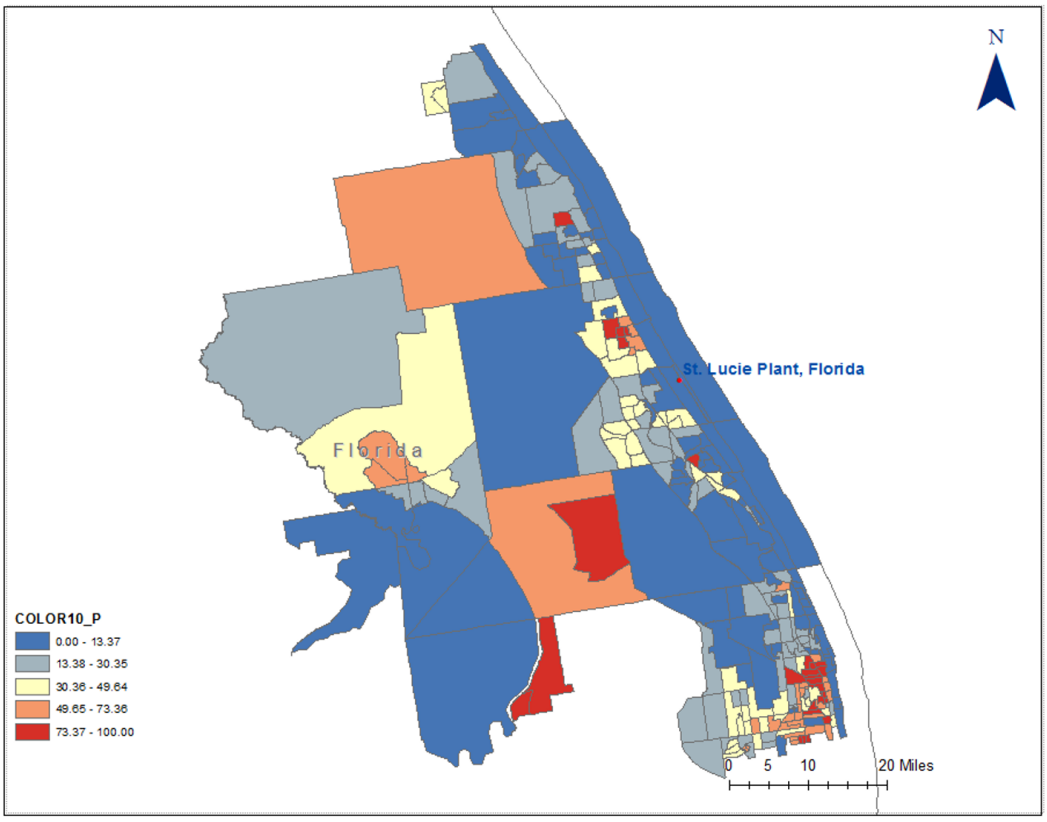

Figure C. 9 Spatial distribution of percent Color among the populations surrounding Crystal River Nuclear Generating Plant

Table C. 33

Descriptive Statistics for Study Variables at Crystal River Nuclear Generating Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.240	0.705	0.496	3.911
Black (%)	14.887	22.060	0.000	96.951
Asian (%)	1.567	1.894	0.000	9.450
Hispanic (%)	13.491	13.635	0.000	69.725
Color (%)	31.012	26.742	0.000	100.000
Population Density (LN)	6.849	1.929	0.000	9.413
Below Poverty (%)	12.426	10.458	0.000	55.987
Owner Occupied Units (%)	54.982	20.306	0.000	100.000
Observations	268			

Table C. 34

*Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Crystal River Nuclear Generating Plan*t

	rho	p	count
Black (%)	0.0953	0.1198	268
Asian (%)	0.1332	0.0292	268
Hispanic (%)	0.1457	0.0170	268
Color (%)	0.1654	0.0067	268
Population Density (LN)	0.0661	0.2810	268
Below Poverty (%)	0.0199	0.7453	268
Owner Occupied Units (%)	-0.0102	0.8683	268

Table C. 35

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Crystal River Nuclear Generating Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0033	0.0068*
			(1.645)	(2.402)
Asian (%)			0.0513*	0.0403+
			(2.188)	(1.665)
Hispanic (%)			0.0071*	0.0104**
			(2.184)	(2.833)
Color (%)	0.0044*	0.0090***		
	(2.503)	(3.590)		
Population Density (LN)	0.0000	0.0001	-0.0130	-0.0060
	(0.002)	(0.005)	(-0.528)	(-0.226)
Below Poverty (%)		-0.0163*		-0.0127+
		(-2.590)		(-1.933)
Owner Occupied Units (%)		-0.0009		-0.0013
		(-0.383)		(-0.527)
Constant	3.1048***	3.2126***	3.1043***	3.2049***
	(19.662)	(17.796)	(19.733)	(17.773)
Observations	268	268	268	268
R-squared	0.027	0.052	0.046	0.059
F	3.7267	3.5959	3.1613	2.7473
Log-likelihood	-282.2248	-278.8065	-279.6490	-277.7353
Akaike Info Coefficient	570.4497	567.6131	569.2979	569.4706
Moran's I-Queen	0.9251***	0.9039***	0.9061***	0.8982***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 36

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Crystal River Nuclear Generating Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0006	0.0006
			(1.520)	(1.230)
Asian (%)			0.0042	0.0040
			(0.982)	(0.896)
Hispanic (%)			0.0006	0.0007
			(1.081)	(0.973)
Color (%)	0.0006+	0.0007		
	(1.827)	(1.576)		
Population Density (LN)	-0.0111*	-0.0123*	-0.0119**	-0.0130**
	(-2.511)	(-2.573)	(-2.635)	(-2.662)
Below Poverty (%)		-0.0003		0.0000
		(-0.242)		(0.014)
Owner Occupied Units (%)		0.0003		0.0003
		(0.611)		(0.583)
Constant	0.1042**	0.0974*	0.1062**	0.0976*
	(2.804)	(2.356)	(2.834)	(2.357)
Spatial Autoregressive Coefficient (Rho)	0.9861***	0.9859***	0.9856***	0.9856***
	(127.882)	(126.338)	(125.388)	(125.299)
Observations	268	268	268	268
R-squared	0.9673	0.9673	0.9673	0.9674
Log-likelihood Queen	125.6924	125.9643	126.0414	126.2176
Akaike Info Coefficient	-243.39	-239.93	-240.08	-236.44
Moran's I-Queen	0.0173	0.0185	0.0196	0.0177

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

10. Turkey Point Nuclear Generating, Florida

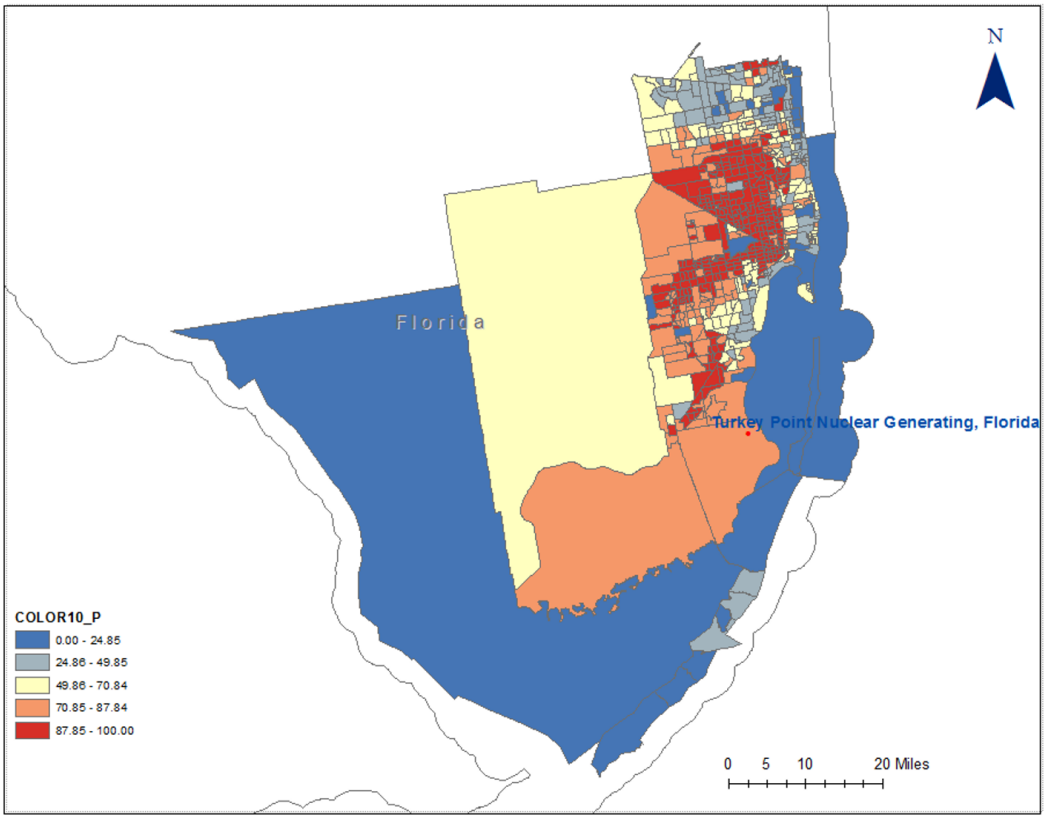

Figure C. 10 Spatial distribution of percent Color among the populations surrounding Turkey Point Nuclear Generating

Table C. 37

Descriptive Statistics for Study Variables at Turkey Point Nuclear Generating

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.314	0.430	1.552	3.912
Black (%)	18.659	26.106	0.000	98.568
Asian (%)	2.047	2.748	0.000	19.143
Hispanic (%)	52.772	29.693	0.000	100.000
Color (%)	73.327	25.208	0.000	100.000
Population Density (LN)	8.511	1.452	0.000	10.785
Below Poverty (%)	15.499	11.951	0.000	86.096
Owner Occupied Units (%)	52.100	24.659	0.000	100.000
Observations	691			

Table C. 38

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Turkey Point Nuclear Generating

	rho	p	count
Black (%)	0.1437	0.0002	691
Asian (%)	0.0944	0.0130	691
Hispanic (%)	-0.3464	0.0000	691
Color (%)	-0.2405	0.0000	691
Population Density (LN)	0.1158	0.0023	691
Below Poverty (%)	-0.0869	0.0224	691
Owner Occupied Units (%)	0.0493	0.1954	691

Table C. 39

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Turkey Point Nuclear Generating

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0031***	-0.0025**
			(-4.276)	(-2.993)
Asian (%)			0.0024	0.0006
			(0.436)	(0.108)
Hispanic (%)			-0.0083***	-0.0079***
			(-12.008)	(-11.036)
Color (%)	-0.0066***	-0.0068***		
	(-9.510)	(-8.969)		
Population Density (LN)	0.0896***	0.0883***	0.0999***	0.1012***
	(7.440)	(7.292)	(8.650)	(8.688)
Below Poverty (%)		0.0015		-0.0024
		(0.860)		(-1.423)
Owner Occupied Units (%)		0.0007		-0.0000
		(0.971)		(-0.001)
Constant	3.0348***	3.0028***	2.9521***	2.9547***
	(33.338)	(30.942)	(33.559)	(31.720)
Observations	691	691	691	691
R-squared	0.128	0.129	0.211	0.214
F	50.5015	25.4917	45.7974	31.0273
Log-likelihood	-349.4332	-348.8814	-314.9860	-313.5902
Akaike Info Coefficient	704.8665	707.7627	639.9719	641.1803
Moran's I-Queen	0.9125***	0.9089***	0.8869***	0.8832***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 40

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Turkey Point Nuclear Generating

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0002+	-0.0002+
			(-1.887)	(-1.659)
Asian (%)			-0.0008	-0.0006
			(-0.934)	(-0.659)
Hispanic (%)			-0.0003*	-0.0003*
			(-2.302)	(-2.169)
Color (%)	-0.0003*	-0.0003*		
	(-2.295)	(-2.144)		
Population Density (LN)	0.0058**	0.0060**	0.0060**	0.0062**
	(3.061)	(3.167)	(3.091)	(3.187)
Below Poverty (%)		-0.0000		-0.0001
		(-0.113)		(-0.272)
Owner Occupied Units (%)		-0.0002		-0.0002
		(-1.454)		(-1.493)
Constant	0.0121	0.0188	0.0135	0.0200
	(0.595)	(0.909)	(0.657)	(0.949)
Spatial Autoregressive Coefficient (Rho)	0.9877***	0.9880***	0.9874***	0.9876***
	(207.023)	(208.435)	(198.921)	(200.051)
Observations	691	691	691	691
R-squared	0.9791	0.9792	0.9791	0.9792
Log-likelihood Queen	832.4237	833.8118	832.6681	833.9513
Akaike Info Coefficient	-1656.87	-1655.65	-1653.36	-1651.93
Moran's I-Queen	0.0099	0.0114	0.0107	0.0114

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

11. Edwin I. Hatch Nuclear Plant, Georgia

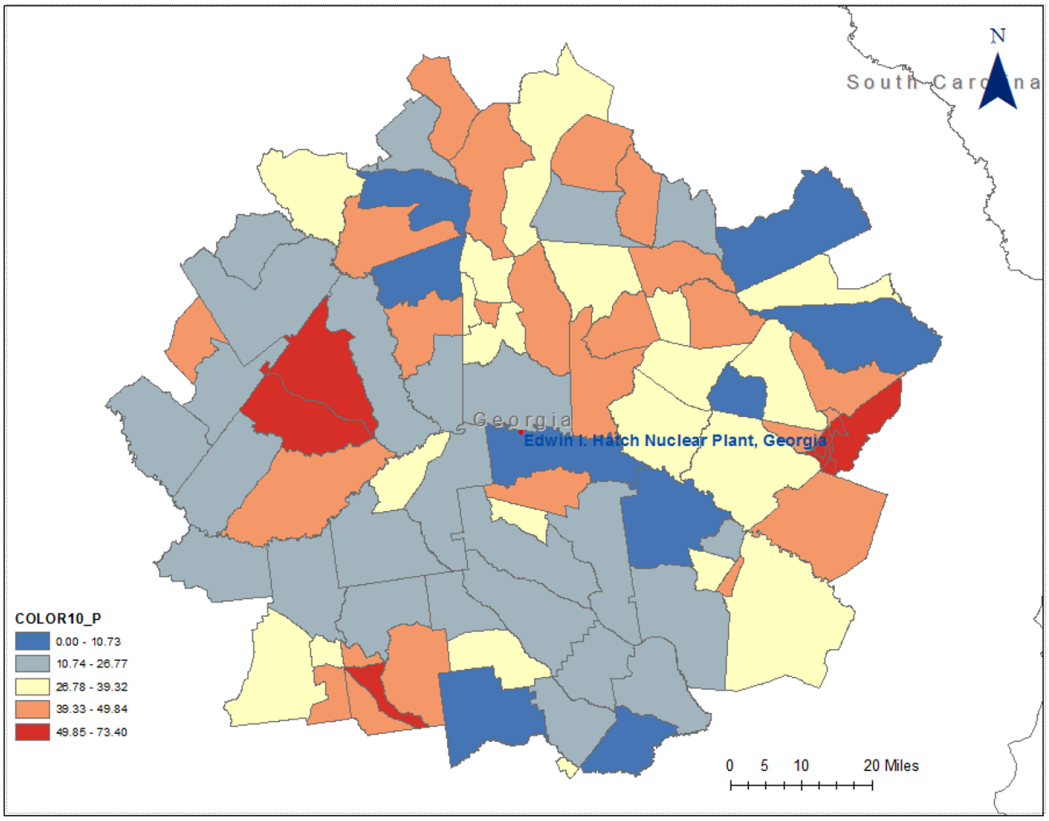

Figure C. 11 Spatial distribution of percent Color among the populations surrounding Edwin I. Hatch Nuclear Plant

Table C. 41

Descriptive Statistics for Study Variables at Edwin I. Hatch Nuclear Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.432	0.467	1.697	3.908
Black (%)	24.529	14.910	0.000	55.481
Asian (%)	0.741	1.304	0.000	6.358
Hispanic (%)	7.145	6.778	0.000	29.350
Color (%)	33.582	16.738	0.000	73.395
Population Density (LN)	4.106	1.480	0.000	8.203
Below Poverty (%)	19.925	7.514	0.000	37.540
Owner Occupied Units (%)	54.413	16.319	0.000	76.623
Observations	88			

Table C. 42

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Edwin I. Hatch Nuclear Plant

	rho	p	count
Black (%)	0.1778	0.0976	88
Asian (%)	0.0934	0.3868	88
Hispanic (%)	-0.2065	0.0536	88
Color (%)	0.0931	0.3885	88
Population Density (LN)	0.1100	0.3074	88
Below Poverty (%)	-0.1535	0.1534	88
Owner Occupied Units (%)	-0.1470	0.1718	88

Table C. 43

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Edwin I. Hatch Nuclear Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0035	0.0040
			(0.804)	(0.833)
Asian (%)			0.0300	-0.0046
			(0.673)	(-0.094)
Hispanic (%)			-0.0158*	-0.0141+
			(-2.013)	(-1.694)
Color (%)	0.0008	0.0023		
	(0.188)	(0.480)		
Population Density (LN)	0.0281	0.0255	0.0195	0.0369
	(0.577)	(0.515)	(0.378)	(0.691)
Below Poverty (%)		-0.0120		-0.0101
		(-1.634)		(-1.365)
Owner Occupied Units (%)		-0.0031		-0.0040
		(-0.966)		(-1.176)
Constant	3.2896***	3.6600***	3.3566***	3.7026***
	(22.187)	(14.850)	(21.907)	(15.161)
Observations	88	88	88	88
R-squared	0.013	0.062	0.082	0.122
F	0.5389	1.3823	1.8552	1.8775
Log-likelihood	-56.7636	-54.4805	-53.5501	-51.5884
Akaike Info Coefficient	119.5273	118.9609	117.1001	117.1768
Moran's I-Queen	0.6976***	0.6925***	0.6677***	0.6425***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 44

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Edwin I. Hatch Nuclear Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0006	0.0011
			(0.358)	(0.645)
Asian (%)			0.0148	0.0087
			(0.914)	(0.496)
Hispanic (%)			-0.0068*	-0.0058+
			(-2.369)	(-1.900)
Color (%)	-0.0006	0.0003		
	(-0.376)	(0.154)		
Population Density (LN)	-0.0060	-0.0089	-0.0125	-0.0112
	(-0.333)	(-0.492)	(-0.669)	(-0.578)
Below Poverty (%)		-0.0044		-0.0034
		(-1.628)		(-1.287)
Owner Occupied Units (%)		-0.0003		-0.0004
		(-0.292)		(-0.291)
Constant	0.1384+	0.2318*	0.1721*	0.2423*
	(1.679)	(2.029)	(2.020)	(2.114)
Spatial Autoregressive Coefficient (Rho)	0.9773***	0.9762***	0.9762***	0.9752***
	(50.929)	(49.061)	(49.275)	(47.622)
Observations	88	88	88	88
R-squared	0.9620	0.9663	0.8721	0.8745
Log-likelihood Queen	13.2032	14.7056	16.6792	17.6006
Akaike Info Coefficient	-18.41	-17.41	-21.36	-19.21
Moran's I-Queen	0.2886***	0.2913***	0.2426***	0.2395

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

12. Vogtle Electric Generating Plant, Georgia

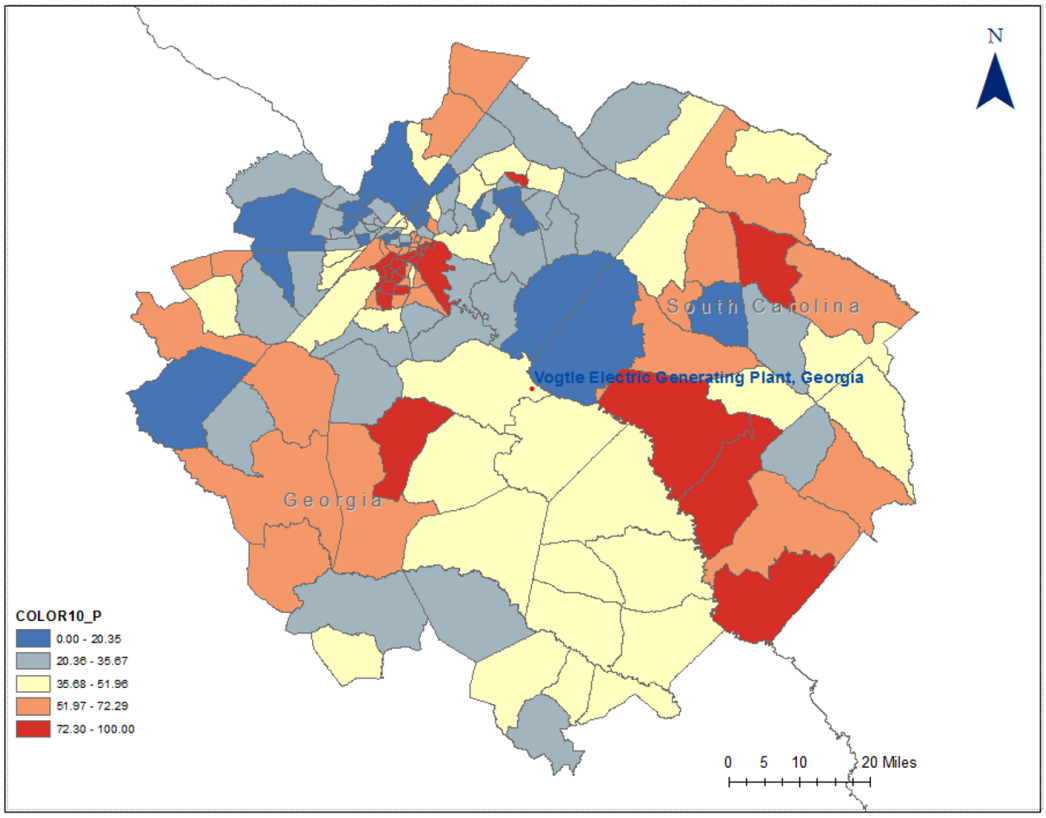

Figure C. 12 Spatial distribution of percent Color among the populations surrounding Vogtle Electric Generating Plant

Table C. 45

Descriptive Statistics for Study Variables at Vogtle Electric Generating Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.390	0.315	2.116	3.908
Black (%)	39.445	24.708	0.000	100.000
Asian (%)	1.314	2.517	0.000	17.180
Hispanic (%)	3.344	3.423	0.000	18.556
Color (%)	45.420	23.758	0.000	100.000
Population Density (LN)	5.578	1.924	0.000	8.410
Below Poverty (%)	20.050	12.263	0.000	59.382
Owner Occupied Units (%)	57.269	17.965	0.000	90.313

Table C. 46

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Vogtle Electric Generating Plant

	rho	p	count
Black (%)	-0.0894	0.2735	152
Asian (%)	0.0767	0.3478	152
Hispanic (%)	0.0422	0.6060	152
Color (%)	-0.0840	0.3033	152
Population Density (LN)	-0.0239	0.7699	152
Below Poverty (%)	-0.0950	0.2446	152
Owner Occupied Units (%)	0.2177	0.0070	152

Table C. 47

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Vogtle Electric Generating Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0008	0.0004
			(-0.672)	(0.281)
Asian (%)			0.0098	0.0123
			(0.863)	(1.088)
Hispanic (%)			0.0042	0.0053
			(0.532)	(0.681)
Color (%)	-0.0011	0.0001		
	(-0.992)	(0.050)		
Population Density (LN)	-0.0013	-0.0036	-0.0085	-0.0112
	(-0.099)	(-0.268)	(-0.571)	(-0.757)
Below Poverty (%)		0.0005		0.0008
		(0.187)		(0.278)
Owner Occupied Units (%)		0.0040*		0.0042*
		(2.429)		(2.518)
Constant	3.4472***	3.1646***	3.4404***	3.1447***
	(39.905)	(20.987)	(39.604)	(20.691)
Observations	152	152	152	152
R-squared	0.007	0.048	0.014	0.058
F	0.5348	1.8653	0.5394	1.4884
Log-likelihood	-38.8281	-35.6089	-38.2643	-34.8295
Akaike Info Coefficient	83.6563	81.2178	86.5287	83.6590
Moran's I-Queen	0.7400***	0.7276***	0.7336***	0.7218***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 48

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Vogtle Electric Generating Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0005	0.0008
			(1.353)	(1.641)
Asian (%)			0.0009	0.0018
			(0.251)	(0.492)
Hispanic (%)			0.0002	0.0006
			(0.067)	(0.228)
Color (%)	0.0005	0.0008		
	(1.351)	(1.567)		
Population Density (LN)	-0.0010	-0.0015	-0.0010	-0.0018
	(-0.213)	(-0.331)	(-0.199)	(-0.375)
Below Poverty (%)		0.0007		0.0007
		(0.738)		(0.718)
Owner Occupied Units (%)		0.0015**		0.0015**
		(2.763)		(2.794)
Constant	0.0344	-0.0742	0.0355	-0.0742
	(0.741)	(-1.218)	(0.765)	(-1.213)
Spatial Autoregressive Coefficient (Rho)	0.9880***	0.9877***	0.9880***	0.9876***
	(93.467)	(91.395)	(93.237)	(90.729)
Observations	152	152	152	152
R-squared	0.8884	0.8937	0.8884	0.8938
Log-likelihood Queen	100.0005	103.7540	100.0312	103.8746
Akaike Info Coefficient	-192.00	-195.51	-188.06	-199.75
Moran's I-Queen	0.2909***	0.2685***	0.2905***	0.2663***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

13. Braidwood Station, Illinois, 16. Dresden Nuclear Power Station, Illinois and 17. LaSalle County Station, Illinois

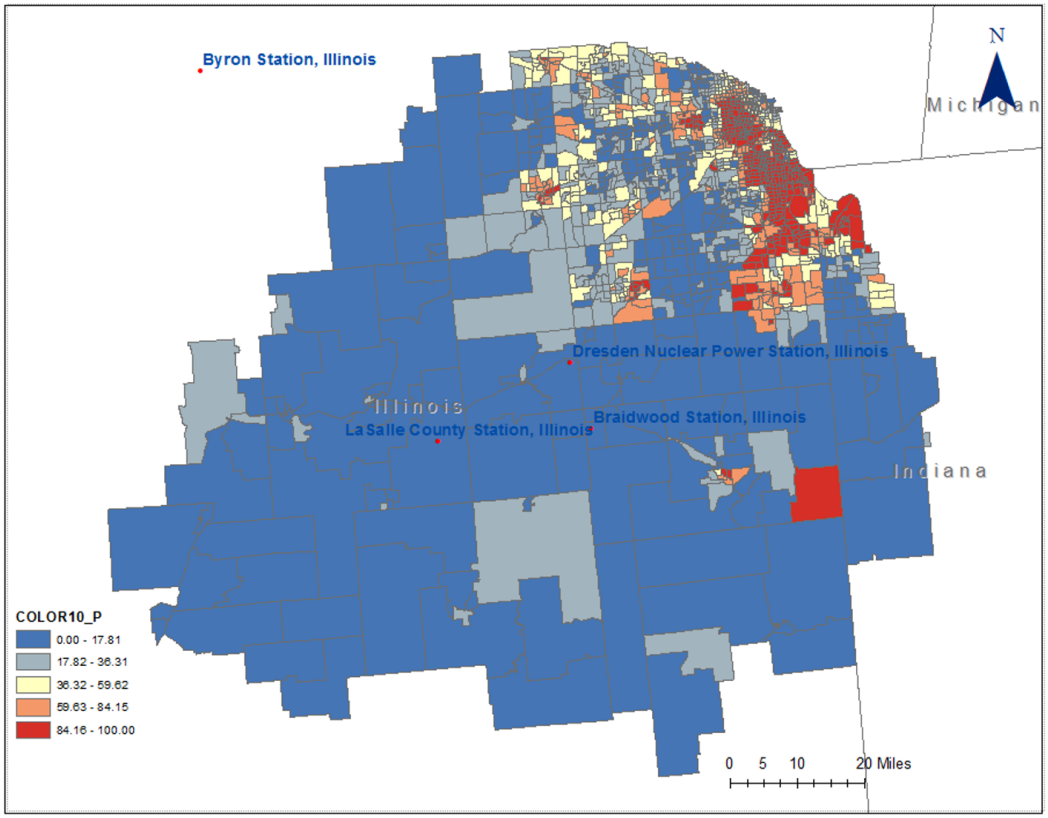

Figure C. 13 Spatial distribution of percent Color among the populations surrounding Braidwood Station, Dresden Nuclear Power Station, and LaSalle County Station

Table C. 49

Descriptive Statistics for Study Variables at Braidwood Station, Dresden Nuclear Power Station, and LaSalle County Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.567	0.394	0.233	3.912
Black (%)	25.631	35.781	0.000	100.000
Asian (%)	4.263	7.276	0.000	85.280
Hispanic (%)	20.935	25.293	0.000	100.000
Color (%)	51.835	34.237	0.000	100.000
Population Density (LN)	8.424	1.514	0.000	11.319
Below Poverty (%)	15.218	13.614	0.000	85.803
Owner Occupied Units (%)	58.688	24.492	0.000	100.000
Observations	1668			

Table C. 50

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Braidwood Station, Dresden Nuclear Power Station, and LaSalle County Station

	rho	p	count
Black (%)	0.1794	0.0000	1668
Asian (%)	0.1292	0.0000	1668
Hispanic (%)	0.1738	0.0000	1668
Color (%)	0.3386	0.0000	1668
Population Density (LN)	0.4720	0.0000	1668
Below Poverty (%)	0.2469	0.0000	1668
Owner Occupied Units (%)	-0.3460	0.0000	1668

Table C. 51

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Braidwood Station, Dresden Nuclear Power Station, and LaSalle County Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0019***	0.0011**
			(6.480)	(2.802)
Asian (%)			0.0085***	0.0074***
			(6.715)	(5.889)
Hispanic (%)			0.0019***	0.0012**
			(4.687)	(2.641)
Color (%)	0.0016***	0.0009*		
	(5.475)	(2.404)		
Population Density (LN)	0.1050***	0.0986***	0.0983***	0.0925***
	(16.304)	(15.336)	(14.941)	(14.090)
Below Poverty (%)		-0.0029**		-0.0021*
		(-2.816)		(-1.982)
Owner Occupied Units (%)		-0.0035***		-0.0033***
		(-6.694)		(-6.307)
Constant	2.6023***	2.9384***	2.6137***	2.9273***
	(52.844)	(41.936)	(53.089)	(42.005)
Observations	1668	1668	1668	1668
R-squared	0.237	0.257	0.251	0.270
F	257.9117	143.7113	139.5615	102.3449
Log-likelihood	-585.8202	-563.2915	-569.5008	-548.5294
Akaike Info Coefficient	1177.6403	1136.5830	1149.0015	1111.0588
Moran's I-Queen	0.8539***	0.8495***	0.8486***	0.8454***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 52

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Braidwood Station, Dresden Nuclear Power Station, and LaSalle County Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0001	0.0001
			(1.304)	(0.720)
Asian (%)			0.0003	0.0003
			(1.167)	(1.060)
Hispanic (%)			0.0001	0.0001
			(1.163)	(0.852)
Color (%)	0.0001	0.0001		
	(1.179)	(0.692)		
Population Density (LN)	-0.0020	-0.0021	-0.0022+	-0.0024+
	(-1.551)	(-1.641)	(-1.712)	(-1.791)
Below Poverty (%)		-0.0001		-0.0001
		(-0.404)		(-0.250)
Owner Occupied Units (%)		-0.0001		-0.0001
		(-0.858)		(-0.781)
Constant	0.0389**	0.0480**	0.0402**	0.0485**
	(3.210)	(2.965)	(3.277)	(2.981)
Spatial Autoregressive Coefficient (Rho)	0.9931***	0.9928***	0.9928***	0.9926***
	(340.172)	(333.544)	(334.302)	(328.400)
Observations	1668	1668	1668	1668
R-squared	0.9717	0.9717	0.9717	0.9717
Log-likelihood Queen	1895.7165	1896.0861	1896.2368	1896.5606
Akaike Info Coefficient	-3783.74	-3779.78	-3780.28	-3776.94
Moran's I-Queen	0.0101	0.0098	0.0102	0.0099

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

14. Byron Station, Illinois

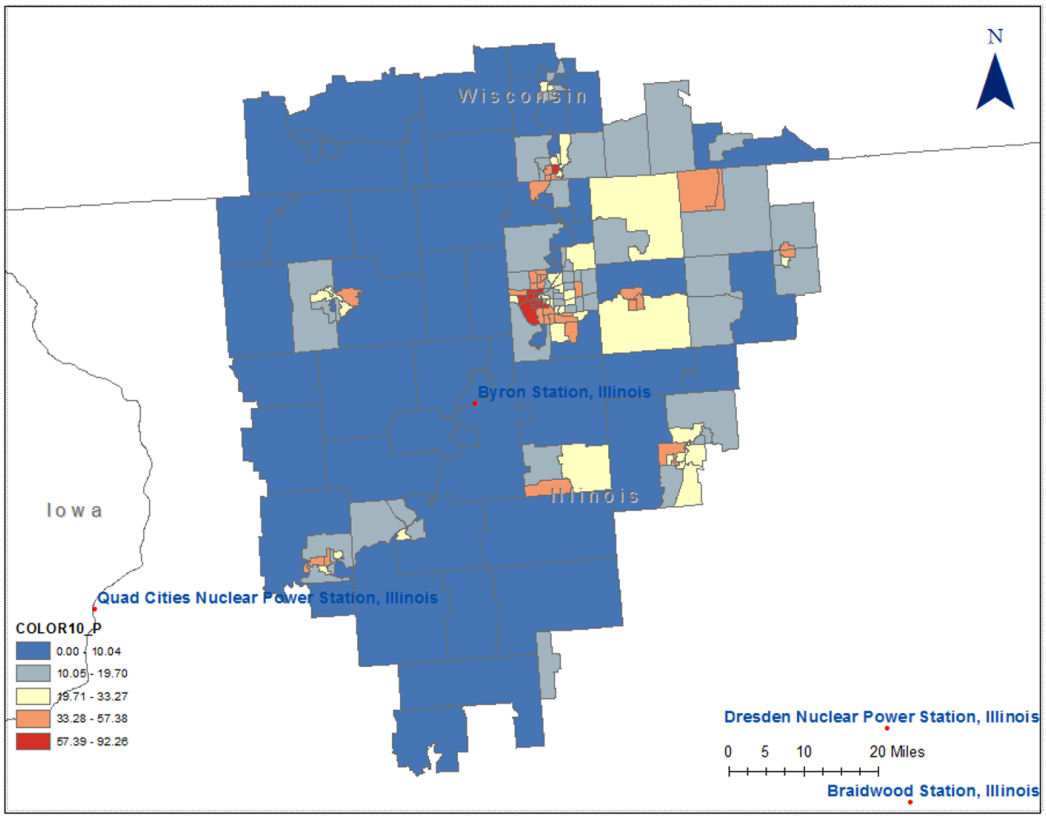

Figure C. 14 Spatial distribution of percent Color among the populations surrounding Byron Station

Table C. 53
Descriptive Statistics for Study Variables at Byron Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.211	0.467	0.665	3.905
Black (%)	7.918	12.902	0.000	75.330
Asian (%)	1.517	2.206	0.000	17.158
Hispanic (%)	10.385	10.310	0.000	62.757
Color (%)	21.402	18.750	0.000	92.257
Population Density (LN)	6.538	1.807	0.000	9.656
Below Poverty (%)	15.362	13.308	0.000	62.360
Owner Occupied Units (%)	63.635	19.717	0.000	94.518
Observations	201			

Table C. 54
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Byron Station

	rho	p	count
Black (%)	-0.2495	0.0004	201
Asian (%)	-0.0274	0.6989	201
Hispanic (%)	-0.0291	0.6813	201
Color (%)	-0.1963	0.0052	201
Population Density (LN)	-0.0305	0.6673	201
Below Poverty (%)	-0.1249	0.0772	201
Owner Occupied Units (%)	0.1369	0.0526	201

Table C. 55

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Byron Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0108***	-0.0143***
			(-3.881)	(-3.747)
Asian (%)			-0.0140	-0.0154
			(-0.924)	(-1.015)
Hispanic (%)			-0.0002	-0.0014
			(-0.066)	(-0.400)
Color (%)	-0.0062**	-0.0071*		
	(-3.052)	(-2.586)		
Population Density (LN)	0.0259	0.0288	0.0287	0.0291
	(1.230)	(1.339)	(1.349)	(1.345)
Below Poverty (%)		0.0049		0.0087+
		(1.015)		(1.755)
Owner Occupied Units (%)		0.0032		0.0036
		(1.217)		(1.406)
Constant	3.1742***	2.8971***	3.1327***	2.8072***
	(25.370)	(11.149)	(25.018)	(10.854)
Observations	201	201	201	201
R-squared	0.046	0.053	0.073	0.088
F	4.7553	2.7663	3.8679	3.1325
Log-likelihood	-127.0434	-126.2391	-124.1228	-122.4651
Akaike Info Coefficient	260.0868	262.4781	258.2457	258.9302
Moran's I-Queen	0.8299***	0.8261***	0.8112***	0.8001***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 56

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Byron Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0001	-0.0007
			(0.119)	(-0.686)
Asian (%)			0.0010	0.0007
			(0.266)	(0.192)
Hispanic (%)			0.0010	0.0008
			(1.257)	(0.939)
Color (%)	0.0005	0.0002		
	(1.013)	(0.340)		
Population Density (LN)	-0.0060	-0.0056	-0.0058	-0.0058
	(-1.154)	(-1.056)	(-1.096)	(-1.074)
Below Poverty (%)		0.0012		0.0017
		(1.015)		(1.430)
Owner Occupied Units (%)		0.0006		0.0007
		(1.004)		(1.082)
Constant	0.0591	0.0036	0.0570	-0.0041
	(1.527)	(0.054)	(1.452)	(-0.060)
Spatial Autoregressive Coefficient (Rho)	0.9910***	0.9908***	0.9905***	0.9902***
	(132.099)	(130.626)	(127.425)	(124.339)
Observations	201	201	201	201
R-squared	0.9417	0.9421	0.9418	0.9423
Log-likelihood Queen	115.8133	116.4335	116.1126	117.1576
Akaike Info Coefficient	-223.63	-220.87	-220.23	-218.32
Moran's I-Queen	0.3896***	0.3934***	0.3888***	0.3922***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

15. Clinton Power Station, Illinois

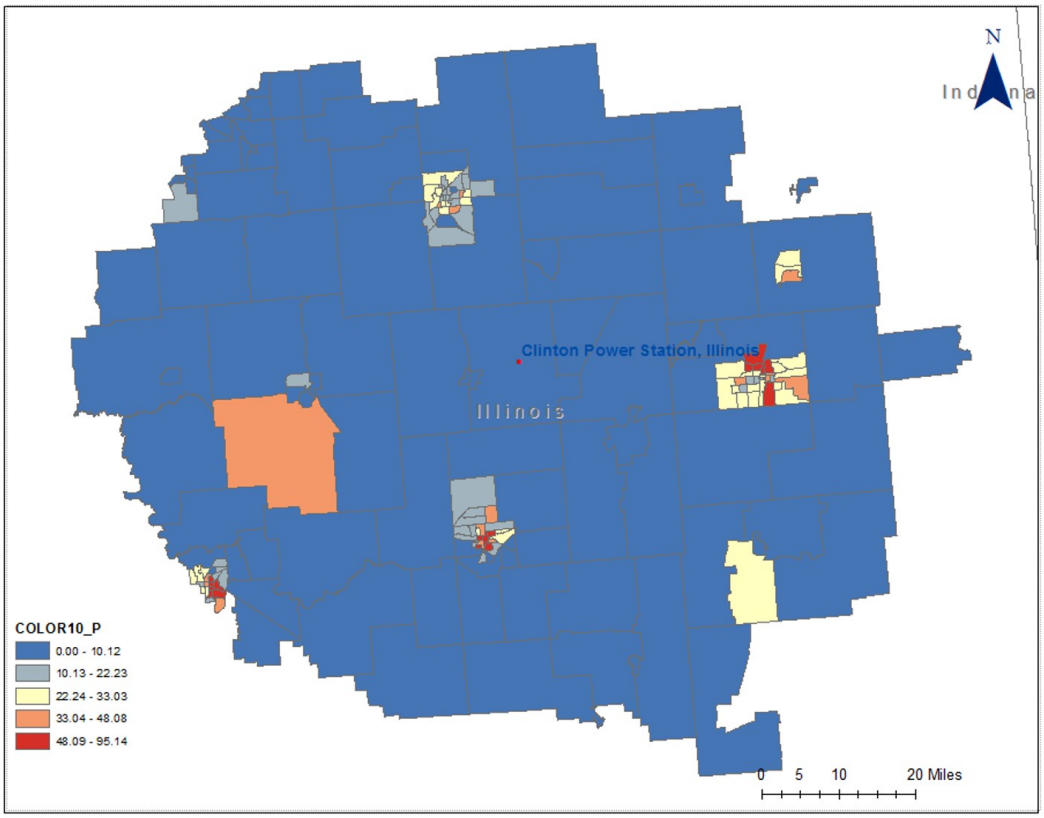

Figure C. 15 Spatial distribution of percent Color among the populations surrounding Clinton Power Station

Table C. 57
Descriptive Statistics for Study Variables at Clinton Power Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.412	0.420	0.511	3.911
Black (%)	11.225	17.195	0.000	93.490
Asian (%)	2.924	6.230	0.000	43.361
Hispanic (%)	2.949	3.345	0.000	22.239
Color (%)	18.903	19.761	0.000	95.144
Population Density (LN)	6.447	2.034	2.240	10.819
Below Poverty (%)	17.002	16.800	0.000	89.250
Owner Occupied Units (%)	61.043	22.587	0.000	96.280
Observations	206			

Table C. 58
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Clinton Power Station

	rho	p	count
Black (%)	0.0806	0.2496	206
Asian (%)	-0.0688	0.3256	206
Hispanic (%)	-0.0596	0.3951	206
Color (%)	0.0403	0.5647	206
Population Density (LN)	0.0588	0.4012	206
Below Poverty (%)	0.0773	0.2694	206
Owner Occupied Units (%)	-0.0343	0.6245	206

Table C. 59

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Clinton Power Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0012	0.0009
			(0.620)	(0.425)
Asian (%)			-0.0053	-0.0052
			(-1.025)	(-0.924)
Hispanic (%)			-0.0076	-0.0073
			(-0.824)	(-0.788)
Color (%)	0.0002	0.0003		
	(0.134)	(0.145)		
Population Density (LN)	0.0109	0.0094	0.0161	0.0127
	(0.625)	(0.499)	(0.919)	(0.667)
Below Poverty (%)		0.0040		0.0033
		(1.219)		(0.992)
Owner Occupied Units (%)		0.0026		0.0016
		(0.946)		(0.577)
Constant	3.3371***	3.1207***	3.3321***	3.2024***
	(32.788)	(11.847)	(32.217)	(11.936)
Observations	206	206	206	206
R-squared	0.004	0.011	0.018	0.023
F	0.3610	0.5539	0.8987	0.7672
Log-likelihood	-112.7974	-112.0339	-111.3373	-110.8076
Akaike Info Coefficient	231.5948	234.0679	232.6746	235.6153
Moran's I-Queen	0.8311***	0.8264***	0.8226***	0.8197***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 60

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Clinton Power Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0002	-0.0001
			(-0.252)	(-0.154)
Asian (%)			-0.0011	-0.0009
			(-0.550)	(-0.434)
Hispanic (%)			-0.0006	-0.0005
			(-0.185)	(-0.153)
Color (%)	-0.0003	-0.0002		
	(-0.429)	(-0.253)		
Population Density (LN)	0.0014	0.0019	0.0019	0.0022
	(0.218)	(0.277)	(0.290)	(0.314)
Below Poverty (%)		0.0003		0.0002
		(0.216)		(0.156)
Owner Occupied Units (%)		0.0003		0.0002
		(0.331)		(0.232)
Constant	0.2225**	0.1936	0.2241**	0.2032+
	(2.721)	(1.625)	(2.713)	(1.666)
Spatial Autoregressive Coefficient (Rho)	0.9361***	0.9358***	0.9352***	0.9351***
	(42.927)	(42.739)	(42.495)	(42.384)
Observations	206	206	206	206
R-squared	0.8629	0.8629	0.8629	0.8629
Log-likelihood Queen	61.5674	61.6228	61.6793	61.7063
Akaike Info Coefficient	-118.72	-114.84	-114.76	-110.86
Moran's I-Queen	0.0366	0.0368	0.0367	0.0368

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

18. Quad Cities Nuclear Power Station, Illinois

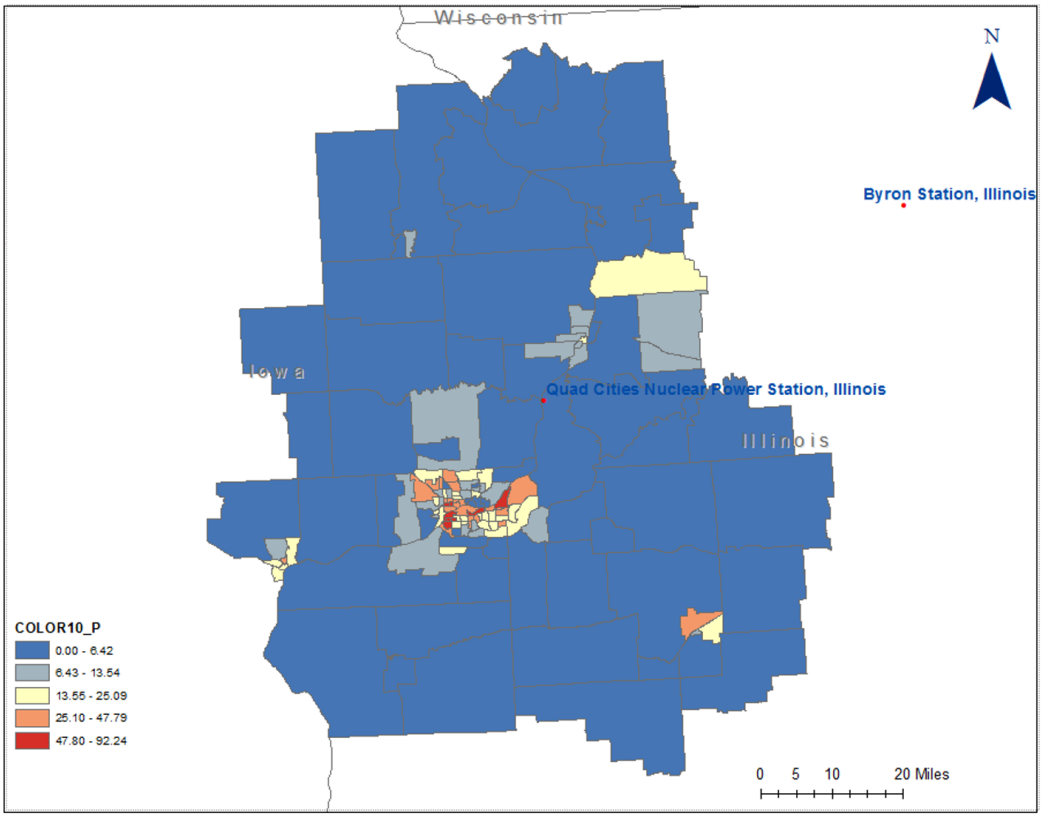

Figure C. 16 Spatial distribution of percent Color among the populations surrounding Quad Cities Nuclear Power Station

Table C. 61

Descriptive Statistics for Study Variables at Quad Cities Nuclear Power Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.071	0.435	1.472	3.879
Black (%)	5.767	10.648	0.000	80.845
Asian (%)	1.177	1.971	0.000	10.957
Hispanic (%)	6.827	8.722	0.000	59.728
Color (%)	15.513	16.131	0.000	92.240
Population Density (LN)	6.227	2.064	2.641	8.927
Below Poverty (%)	13.066	10.016	0.856	59.352
Owner Occupied Units (%)	66.862	15.370	9.604	92.600
Observations	150			

Table C. 62

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Quad Cities Nuclear Power Station

	rho	p	count
Black (%)	-0.1122	0.1718	150
Asian (%)	-0.1394	0.0889	150
Hispanic (%)	-0.0352	0.6688	150
Color (%)	-0.1237	0.1316	150
Population Density (LN)	-0.3350	0.0000	150
Below Poverty (%)	0.0397	0.6294	150
Owner Occupied Units (%)	-0.0345	0.6748	150

Table C. 63

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Quad Cities Nuclear Power Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0009	-0.0038
			(0.265)	(-0.935)
Asian (%)			-0.0063	-0.0134
			(-0.342)	(-0.722)
Hispanic (%)			0.0066	0.0024
			(1.520)	(0.514)
Color (%)	0.0027	-0.0018		
	(1.047)	(-0.545)		
Population Density (LN)	-0.0825***	-0.0803***	-0.0829***	-0.0816***
	(-4.155)	(-4.068)	(-4.121)	(-4.092)
Below Poverty (%)		0.0062		0.0070
		(1.173)		(1.308)
Owner Occupied Units (%)		-0.0029		-0.0025
		(-0.883)		(-0.744)
Constant	3.5432***	3.7077***	3.5440***	3.6736***
	(31.797)	(12.803)	(31.677)	(12.444)
Observations	150	150	150	150
R-squared	0.119	0.145	0.128	0.156
F	9.9081	6.1441	5.3413	4.4158
Log-likelihood	-78.1335	-75.8754	-77.3091	-74.8696
Akaike Info Coefficient	162.2670	161.7507	164.6182	163.7393
Moran's I-Queen	0.8146***	0.8097***	0.8036***	0.7932***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 64

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Quad Cities Nuclear Power Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0004	-0.0003
			(0.377)	(-0.224)
Asian (%)			0.0028	0.0010
			(0.550)	(0.193)
Hispanic (%)			0.0007	-0.0001
			(0.598)	(-0.094)
Color (%)	0.0005	-0.0002		
	(0.751)	(-0.220)		
Population Density (LN)	-0.0121*	-0.0120*	-0.0126*	-0.0123*
	(-2.179)	(-2.173)	(-2.242)	(-2.213)
Below Poverty (%)		-0.0000		-0.0000
		(-0.023)		(-0.017)
Owner Occupied Units (%)		-0.0012		-0.0012
		(-1.402)		(-1.324)
Constant	0.1236*	0.2205*	0.1243*	0.2177*
	(2.318)	(2.394)	(2.332)	(2.337)
Spatial Autoregressive Coefficient (Rho)	0.9841***	0.9834***	0.9842***	0.9835***
	(78.386)	(75.914)	(78.580)	(76.052)
Observations	150	150	150	150
R-squared	0.9317	0.9328	0.9319	0.9328
Log-likelihood Queen	87.6348	88.9463	87.7512	88.9693
Akaike Info Coefficient	-167.27	-165.89	-163.50	-161.94
Moran's I-Queen	0.1938***	0.1852***	0.1922***	0.1851***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

19. Duane Arnold Energy Center, Iowa

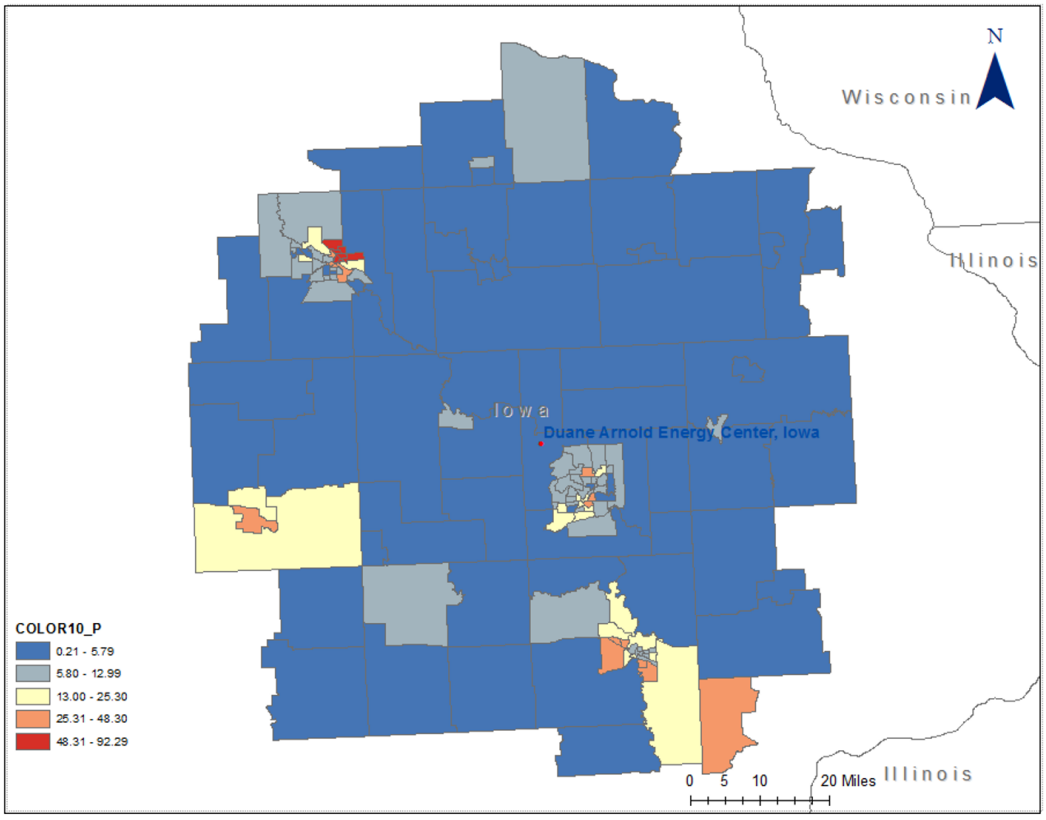

Figure C. 17 Spatial distribution of percent Color among the populations surrounding Duane Arnold Energy Center

Table C. 65
Descriptive Statistics for Study Variables at Duane Arnold Energy Center

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.191	0.660	0.947	3.910
Black (%)	5.175	11.194	0.000	86.769
Asian (%)	1.641	2.723	0.000	22.077
Hispanic (%)	3.215	4.598	0.000	37.323
Color (%)	11.990	14.582	0.212	92.287
Population Density (LN)	6.076	2.096	2.321	9.791
Below Poverty (%)	13.737	12.954	1.326	80.685
Owner Occupied Units (%)	65.900	18.336	2.675	94.953
Observations	156			

Table C. 66
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Duane Arnold Energy Center

	rho	p	count
Black (%)	0.0996	0.2158	156
Asian (%)	-0.0393	0.6260	156
Hispanic (%)	0.1569	0.0504	156
Color (%)	0.1220	0.1291	156
Population Density (LN)	-0.2090	0.0088	156
Below Poverty (%)	0.1984	0.0130	156
Owner Occupied Units (%)	-0.1038	0.1974	156

Table C. 67

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Duane Arnold Energy Center

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0082+	0.0036
			(1.675)	(0.748)
Asian (%)			0.0067	-0.0030
			(0.337)	(-0.150)
Hispanic (%)			0.0236*	0.0200+
			(2.053)	(1.800)
Color (%)	0.0103**	0.0061		
	(2.757)	(1.596)		
Population Density (LN)	-0.0920***	-0.1255***	-0.0896**	-0.1231***
	(-3.526)	(-4.509)	(-3.329)	(-4.386)
Below Poverty (%)		0.0209**		0.0205**
		(2.875)		(2.797)
Owner Occupied Units (%)		0.0035		0.0029
		(0.657)		(0.521)
Constant	3.6265***	3.3612***	3.6063***	3.3888***
	(23.145)	(6.677)	(22.552)	(6.580)
Observations	156	156	156	156
R-squared	0.089	0.171	0.098	0.182
F	7.4682	7.7840	4.1018	5.5105
Log-likelihood	-148.7833	-141.4257	-148.0031	-140.4169
Akaike Info Coefficient	303.5666	292.8515	306.0061	294.8339
Moran's I-Queen	0.8950***	0.8265***	0.8881***	0.8182***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 68

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Duane Arnold Energy Center

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0002	-0.0002
			(0.195)	(-0.219)
Asian (%)			0.0007	-0.0016
			(0.174)	(-0.362)
Hispanic (%)			0.0023	0.0020
			(0.913)	(0.796)
Color (%)	0.0007	0.0003		
	(0.838)	(0.302)		
Population Density (LN)	-0.0113*	-0.0157*	-0.0110+	-0.0153*
	(-1.987)	(-2.485)	(-1.884)	(-2.398)
Below Poverty (%)		-0.0003		-0.0003
		(-0.177)		(-0.205)
Owner Occupied Units (%)		-0.0014		-0.0015
		(-1.145)		(-1.230)
Constant	0.1476**	0.2795*	0.1454*	0.2893*
	(2.610)	(2.350)	(2.551)	(2.382)
Spatial Autoregressive Coefficient (Rho)	0.9766***	0.9746***	0.9763***	0.9741***
	(76.252)	(72.180)	(75.702)	(71.384)
Observations	156	156	156	156
R-squared	0.9578	0.9583	0.9578	0.9585
Log-likelihood Queen	64.8318	66.1440	64.9927	66.4799
Akaike Info Coefficient	-121.66	-120.29	-117.99	-116.96
Moran's I-Queen	0.0817*	0.0656*	0.0755*	0.547

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

20. Wolf Creek Generating Station, Kansas

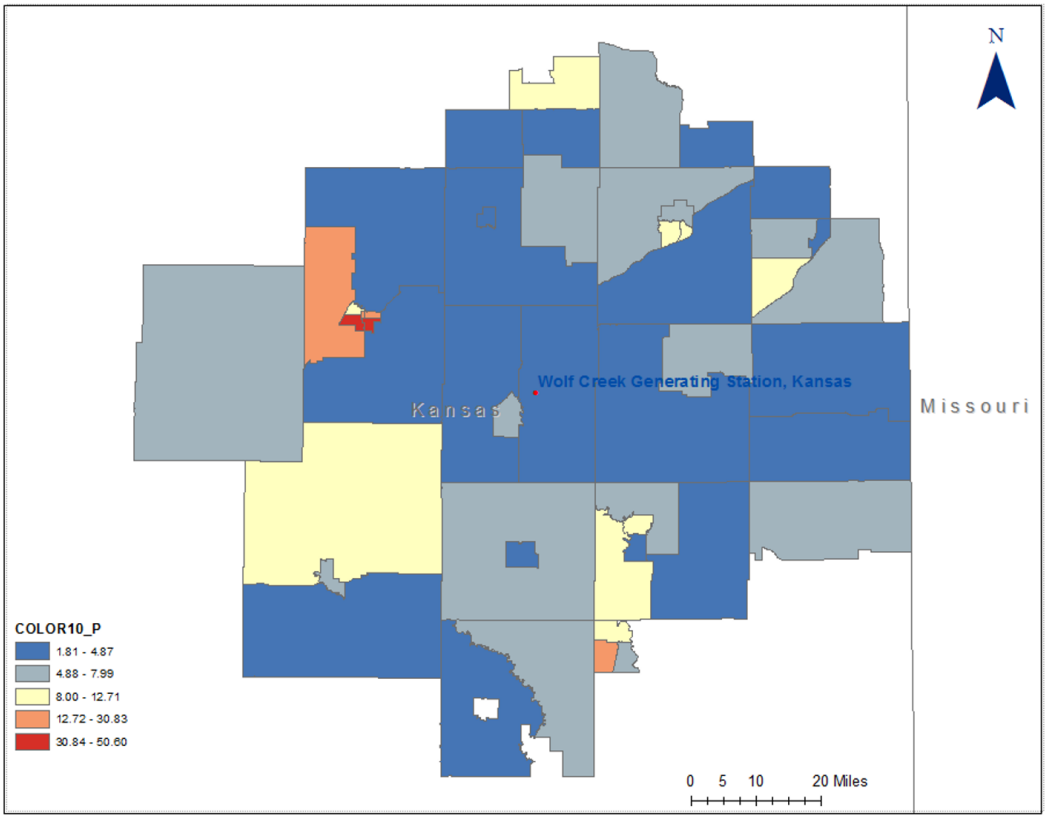

Figure C. 18 Spatial distribution of percent Color among the populations surrounding Wolf Creek Generating Station

Table C. 69
Descriptive Statistics for Study Variables at Wolf Creek Generating Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.458	0.513	1.271	3.912
Black (%)	0.974	1.391	0.000	5.602
Asian (%)	0.696	1.675	0.000	9.475
Hispanic (%)	4.925	8.131	0.000	42.009
Color (%)	9.196	10.017	1.813	50.599
Population Density (LN)	3.934	1.933	1.210	8.765
Below Poverty (%)	13.745	8.882	2.277	44.354
Owner Occupied Units (%)	66.010	12.210	28.847	91.667
Observations	50			

Table C. 70
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Wolf Creek Generating Station

	rho	p	count
Black (%)	0.0132	0.9274	50
Asian (%)	-0.0042	0.9769	50
Hispanic (%)	-0.0234	0.8718	50
Color (%)	-0.0099	0.9454	50
Population Density (LN)	0.0359	0.8048	50
Below Poverty (%)	-0.0968	0.5035	50
Owner Occupied Units (%)	0.0860	0.5527	50

Table C. 71

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Wolf Creek Generating Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0036	-0.0011
			(0.049)	(-0.015)
Asian (%)			-0.0103	0.0250
			(-0.183)	(0.362)
Hispanic (%)			-0.0035	-0.0007
			(-0.316)	(-0.057)
Color (%)	-0.0025	0.0006		
	(-0.270)	(0.061)		
Population Density (LN)	0.0173	0.0282	0.0204	0.0251
	(0.359)	(0.543)	(0.366)	(0.433)
Below Poverty (%)		-0.0060		-0.0070
		(-0.412)		(-0.462)
Owner Occupied Units (%)		0.0027		0.0037
		(0.276)		(0.352)
Constant	3.4132***	3.2438***	3.3993***	3.2009***
	(19.923)	(3.810)	(17.937)	(3.618)
Observations	50	50	50	50
R-squared	0.003	0.019	0.004	0.022
F	0.0668	0.2207	0.0490	0.1648
Log-likelihood	-36.9515	-36.5368	-36.9138	-36.4541
Akaike Info Coefficient	79.9030	83.0736	83.8277	86.9081
Moran's I-Queen	0.5661***	0.5533***	0.5624***	0.5546***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 72

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Wolf Creek Generating Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0016	0.0014
			(-0.040)	(0.033)
Asian (%)			0.0029	0.0036
			(0.091)	(0.095)
Hispanic (%)			-0.0007	-0.0001
			(-0.112)	(-0.015)
Color (%)	-0.0010	-0.0004		
	(-0.183)	(-0.065)		
Population Density (LN)	-0.0001	-0.0033	-0.0023	-0.0055
	(-0.003)	(-0.112)	(-0.073)	(-0.170)
Below Poverty (%)		-0.0028		-0.0033
		(-0.346)		(-0.396)
Owner Occupied Units (%)		-0.0023		-0.0023
		(-0.421)		(-0.403)
Constant	0.4786+	0.6718	0.4807+	0.6795
	(1.771)	(1.273)	(1.767)	(1.273)
Spatial Autoregressive Coefficient (Rho)	0.8744***	0.8767***	0.8746***	0.8762***
	(11.655)	(11.681)	(11.654)	(11.641)
Observations	50	50	50	50
R-squared	0.6522	0.6542	0.6522	0.6541
Log-likelihood Queen	-16.9436	-16.8519	-16.9486	-16.8477
Akaike Info Coefficient	41.88	45.70	45.89	49.69
Moran's I-Queen	0.1417***	0.1493***	0.1412***	0.149***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

21. River Bend Station, Louisiana

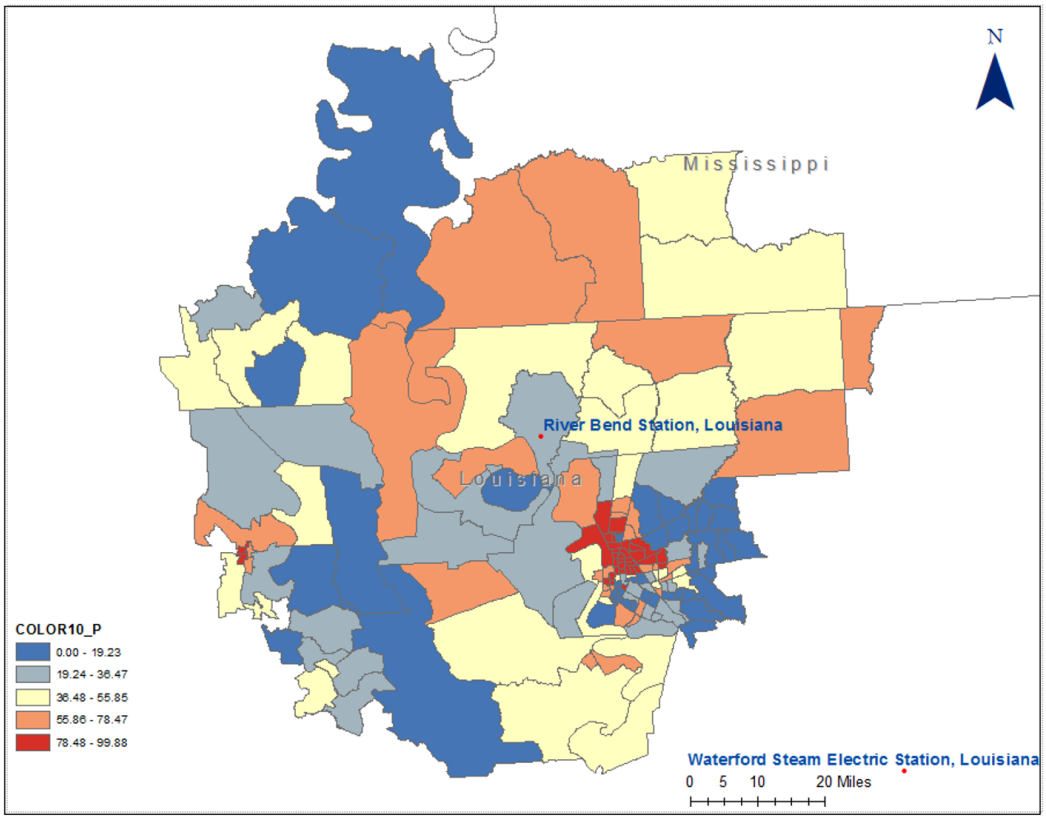

Figure C. 19 Spatial distribution of percent Color among the populations surrounding River Bend Station

Table C. 73
Descriptive Statistics for Study Variables at River Bend Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.277	0.412	1.399	3.911
Black (%)	42.600	30.888	0.000	98.870
Asian (%)	1.632	3.824	0.000	39.897
Hispanic (%)	2.608	3.519	0.000	29.187
Color (%)	47.885	30.032	0.000	99.882
Population Density (LN)	6.278	1.947	0.000	8.734
Below Poverty (%)	20.733	14.166	0.000	55.013
Owner Occupied Units (%)	57.760	20.230	0.000	92.824
Observations	164			

Table C. 74
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at River Bend Station

	rho	p	count
Black (%)	-0.1775	0.0230	164
Asian (%)	0.0485	0.5376	164
Hispanic (%)	0.1273	0.1043	164
Color (%)	-0.1686	0.0309	164
Population Density (LN)	-0.0364	0.6435	164
Below Poverty (%)	0.0606	0.4407	164
Owner Occupied Units (%)	0.0563	0.4743	164

Table C. 75

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at River Bend Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0020+	-0.0036**
			(-1.778)	(-2.654)
Asian (%)			-0.0002	0.0004
			(-0.018)	(0.038)
Hispanic (%)			0.0114	0.0143
			(1.148)	(1.426)
Color (%)	-0.0024*	-0.0042**		
	(-2.138)	(-3.148)		
Population Density (LN)	0.0049	0.0115	-0.0032	0.0014
	(0.279)	(0.664)	(-0.173)	(0.076)
Below Poverty (%)		0.0092**		0.0099**
		(2.863)		(3.082)
Owner Occupied Units (%)		0.0028		0.0041+
		(1.366)		(1.920)
Constant	3.3625***	3.0575***	3.3543***	2.9407***
	(30.739)	(14.994)	(30.380)	(13.945)
Observations	164	164	164	164
R-squared	0.029	0.077	0.040	0.095
F	2.3964	3.3033	1.6521	2.7488
Log-likelihood	-84.4260	-80.2854	-83.4921	-78.6403
Akaike Info Coefficient	174.8519	170.5709	176.9842	171.2806
Moran's I-Queen	0.7932***	0.7717***	0.7902***	0.7637***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 76

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at River Bend Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0000	-0.0003
			(0.095)	(-0.580)
Asian (%)			-0.0006	-0.0001
			(-0.215)	(-0.035)
Hispanic (%)			0.0026	0.0040
			(0.829)	(1.229)
Color (%)	-0.0000	-0.0004		
	(-0.093)	(-0.899)		
Population Density (LN)	-0.0081	-0.0060	-0.0091	-0.0079
	(-1.444)	(-1.068)	(-1.537)	(-1.360)
Below Poverty (%)		0.0024*		0.0026*
		(2.323)		(2.463)
Owner Occupied Units (%)		0.0012+		0.0015*
		(1.808)		(2.121)
Constant	0.1250*	0.0173	0.1233*	-0.0051
	(2.082)	(0.212)	(2.035)	(-0.061)
Spatial Autoregressive Coefficient (Rho)	0.9795***	0.9775***	0.9791***	0.9766***
	(66.431)	(62.748)	(65.656)	(61.217)
Observations	164	164	164	164
R-squared	0.8982	0.9014	0.9791	0.9022
Log-likelihood Queen	72.4965	75.3838	72.8411	76.2401
Akaike Info Coefficient	-136.99	-138.77	-133.68	-136.48
Moran's I-Queen	0.1417***	0.1493***	0.1412***	0.149***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

22. Waterford Steam Electric Station, Louisiana

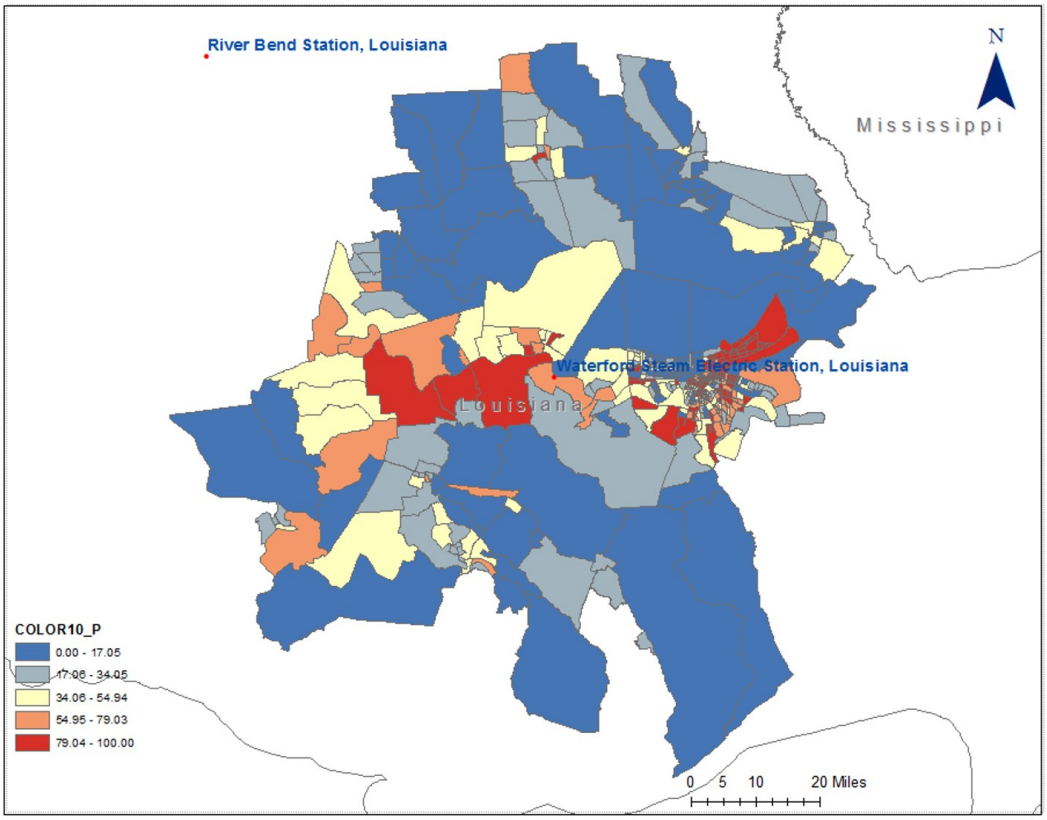

Figure C. 20 Spatial distribution of percent Color among the populations surrounding Waterford Steam Electric Station

Table C. 77

Descriptive Statistics for Study Variables at Waterford Steam Electric Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.143	0.430	0.243	3.901
Black (%)	36.884	33.898	0.000	100.000
Asian (%)	2.152	5.315	0.000	66.365
Hispanic (%)	6.159	7.090	0.000	44.064
Color (%)	46.575	32.542	0.000	100.000
Population Density (LN)	7.342	1.880	0.000	10.181
Below Poverty (%)	18.385	13.613	0.000	84.399
Owner Occupied Units (%)	51.833	23.391	0.000	100.000
Observations	478			

Table C. 78

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Waterford Steam Electric Station

	rho	p	count
Black (%)	-0.0552	0.2280	478
Asian (%)	0.0376	0.4125	478
Hispanic (%)	-0.1368	0.0027	478
Color (%)	-0.0715	0.1186	478
Population Density (LN)	-0.1978	0.0000	478
Below Poverty (%)	0.0385	0.4008	478
Owner Occupied Units (%)	-0.0175	0.7027	478

Table C. 79

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Waterford Steam Electric Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0004	-0.0021**
			(-0.705)	(-2.597)
Asian (%)			0.0059	0.0054
			(1.593)	(1.460)
Hispanic (%)			-0.0067*	-0.0087**
			(-2.247)	(-2.846)
Color (%)	-0.0001	-0.0016*		
	(-0.239)	(-2.008)		
Population Density (LN)	-0.0444***	-0.0462***	-0.0383***	-0.0402***
	(-4.109)	(-4.296)	(-3.404)	(-3.594)
Below Poverty (%)		0.0046*		0.0045*
		(2.390)		(2.359)
Owner Occupied Units (%)		-0.0007		-0.0013
		(-0.743)		(-1.330)
Constant	3.4766***	3.5115***	3.4697***	3.5428***
	(44.553)	(33.077)	(44.673)	(33.493)
Observations	478	478	478	478
R-squared	0.039	0.055	0.053	0.073
F	9.7049	6.9146	6.6151	6.1714
Log-likelihood	-264.3398	-260.3297	-260.9023	-255.8245
Akaike Info Coefficient	534.6796	530.6595	531.8046	525.6491
Moran's I-Queen	0.8916***	0.8769***	0.8792***	0.8583***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 80

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Waterford Steam Electric Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0002	-0.0003+
			(-1.232)	(-1.715)
Asian (%)			0.0003	0.0002
			(0.348)	(0.273)
Hispanic (%)			0.0002	0.0001
			(0.281)	(0.072)
Color (%)	-0.0002	-0.0003		
	(-1.175)	(-1.615)		
Population Density (LN)	-0.0054*	-0.0056*	-0.0059*	-0.0061*
	(-2.176)	(-2.246)	(-2.267)	(-2.348)
Below Poverty (%)		0.0005		0.0005
		(1.002)		(1.105)
Owner Occupied Units (%)		-0.0000		-0.0000
		(-0.199)		(-0.196)
Constant	0.0878**	0.0911**	0.0877**	0.0908**
	(3.014)	(2.672)	(3.020)	(2.645)
Spatial Autoregressive Coefficient (Rho)	0.9880***	0.9875***	0.9881***	0.9875***
	(147.885)	(144.698)	(148.082)	(144.243)
Observations	478	478	478	478
R-squared	0.9488	0.9489	0.9489	0.9490
Log-likelihood Queen	356.3081	356.9425	356.7700	357.5307
Akaike Info Coefficient	-704.62	-701.89	-701.54	-966.06
Moran's I-Queen	0.0990***	0.0958***	0.0960***	0.0929***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

23. Calvert Cliffs Nuclear Power Plant, Maryland

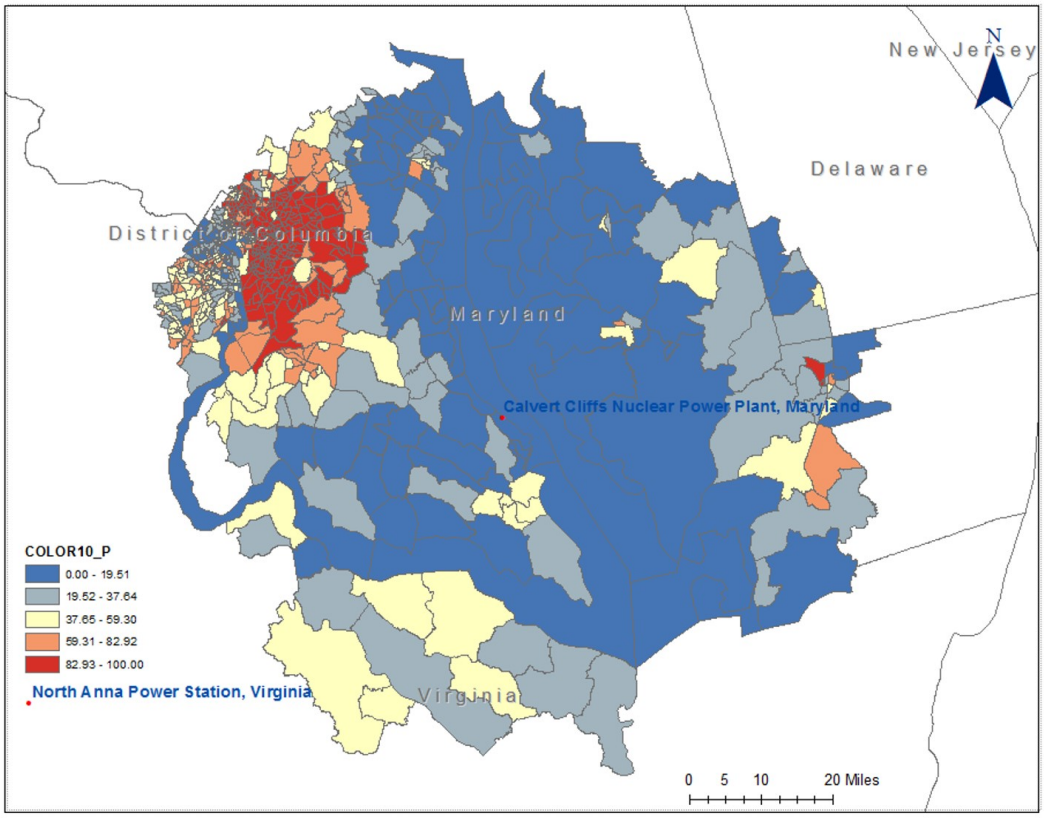

Figure C. 21 Spatial distribution of percent Color among the populations surrounding Calvert Cliffs Nuclear Power Plant

Table C. 81

Descriptive Statistics for Study Variables at Calvert Cliffs Nuclear Power Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.670	0.332	0.958	3.910
Black (%)	38.349	33.522	0.000	100.000
Asian (%)	5.043	6.304	0.000	36.082
Hispanic (%)	10.601	12.808	0.000	90.945
Color (%)	55.866	32.070	0.000	100.000
Population Density (LN)	7.947	1.933	0.000	11.075
Below Poverty (%)	10.066	10.451	0.000	91.176
Owner Occupied Units (%)	55.261	26.805	0.000	100.000
Observations	786			

Table C. 82

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Calvert Cliffs Nuclear Power Plant

	rho	p	count
Black (%)	0.0604	0.0905	786
Asian (%)	0.2630	0.0000	786
Hispanic (%)	0.2633	0.0000	786
Color (%)	0.2195	0.0000	786
Population Density (LN)	0.4815	0.0000	786
Below Poverty (%)	0.1432	0.0001	786
Owner Occupied Units (%)	-0.1495	0.0000	786

Table C. 83

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Calvert Cliffs Nuclear Power Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0004	0.0003
			(1.035)	(0.908)
Asian (%)			0.0079***	0.0081***
			(4.146)	(4.207)
Hispanic (%)			0.0022*	0.0019*
			(2.412)	(2.153)
Color (%)	0.0001	0.0002		
	(0.349)	(0.496)		
Population Density (LN)	0.0817***	0.0813***	0.0693***	0.0685***
	(13.688)	(13.425)	(10.972)	(10.602)
Below Poverty (%)		-0.0015		-0.0004
		(-1.206)		(-0.308)
Owner Occupied Units (%)		-0.0008+		-0.0006
		(-1.762)		(-1.416)
Constant	3.0140***	3.0729***	3.0416***	3.0903***
	(68.605)	(55.040)	(69.459)	(56.124)
Observations	786	786	786	786
R-squared	0.232	0.235	0.259	0.261
F	118.2447	60.0403	68.1182	45.7870
Log-likelihood	-143.4279	-141.7789	-129.5362	-128.4355
Akaike Info Coefficient	292.8558	293.5578	269.0725	270.8710
Moran's I-Queen	0.8347***	0.8392***	0.8271***	0.8295***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 84

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Calvert Cliffs Nuclear Power Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0000	-0.0000
			(-0.217)	(-0.475)
Asian (%)			-0.0000	-0.0000
			(-0.055)	(-0.075)
Hispanic (%)			-0.0001	-0.0001
			(-0.504)	(-0.347)
Color (%)	-0.0000	-0.0000		
	(-0.220)	(-0.456)		
Population Density (LN)	0.0013	0.0012	0.0015	0.0013
	(0.996)	(0.950)	(1.071)	(0.940)
Below Poverty (%)		0.0003		0.0003
		(1.265)		(1.241)
Owner Occupied Units (%)		0.0001		0.0001
		(1.403)		(1.360)
Constant	0.0302+	0.0196	0.0290+	0.0193
	(1.772)	(1.059)	(1.684)	(1.039)
Spatial Autoregressive Coefficient (Rho)	0.9898***	0.9902***	0.9900***	0.9902***
	(206.251)	(209.871)	(206.150)	(208.752)
Observations	786	786	786	786
R-squared	0.9677	0.9678	0.9678	0.9679
Log-likelihood Queen	972.3894	973.6029	972.4997	973.6465
Akaike Info Coefficient	-1936.77	-1935.20	-1932.99	-1931.28
Moran's I-Queen	0.0147*	0.0157*	0.0124*	0.0254**

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

24. Pilgrim Nuclear Power Station, Massachusetts

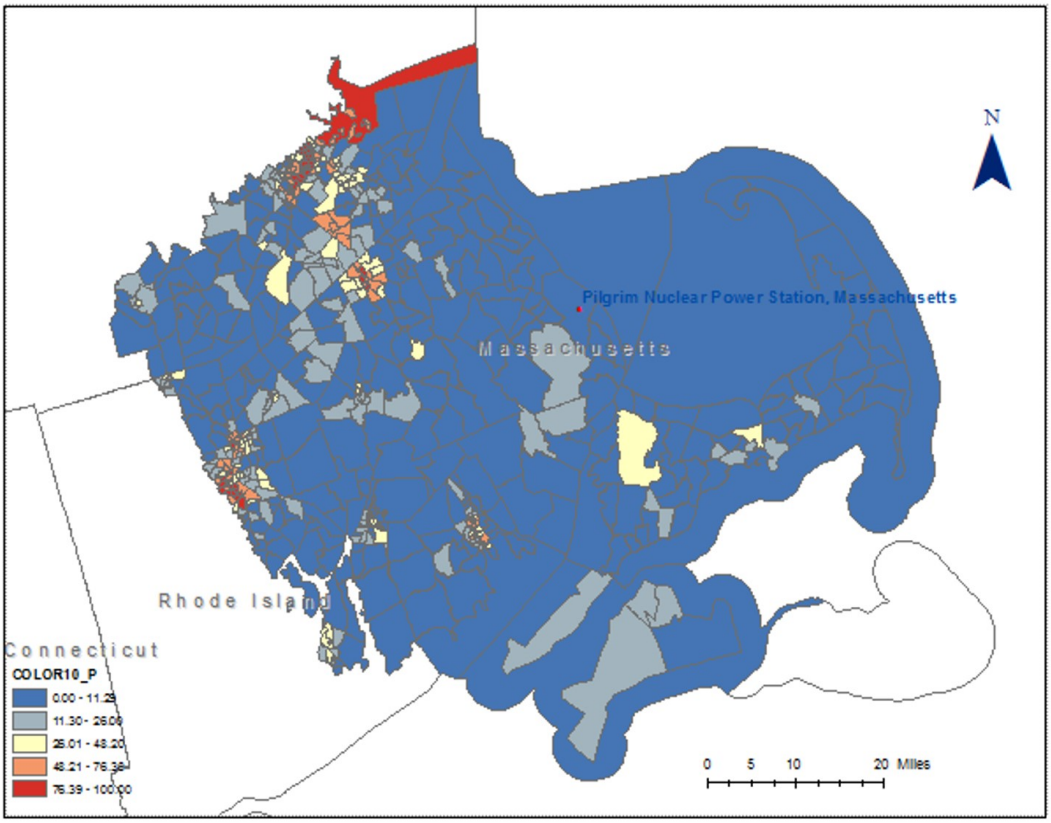

Figure C. 22 Spatial distribution of percent Color among the populations surrounding Pilgrim Nuclear Power Station

Table C. 85

Descriptive Statistics for Study Variables at Pilgrim Nuclear Power Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.393	0.405	-0.188	3.898
Black (%)	9.992	17.062	0.000	94.199
Asian (%)	3.418	5.543	0.000	43.992
Hispanic (%)	8.324	12.590	0.000	74.267
Color (%)	24.118	26.577	0.000	100.000
Population Density (LN)	7.646	1.575	0.000	10.425
Below Poverty (%)	11.806	11.813	0.000	86.328
Owner Occupied Units (%)	56.180	24.965	0.000	100.000
Observations	616			

Table C. 86

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Pilgrim Nuclear Power Station

	rho	p	count
Black (%)	0.1444	0.0003	616
Asian (%)	0.1694	0.0000	616
Hispanic (%)	0.2694	0.0000	616
Color (%)	0.2532	0.0000	616
Population Density (LN)	0.3320	0.0000	616
Below Poverty (%)	0.2071	0.0000	616
Owner Occupied Units (%)	-0.2132	0.0000	616

Table C. 87

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Pilgrim Nuclear Power Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0009	-0.0011
			(-0.908)	(-1.013)
Asian (%)			0.0067*	0.0058*
			(2.308)	(2.002)
Hispanic (%)			0.0051***	0.0050**
			(3.537)	(2.965)
Color (%)	0.0013+	0.0007		
	(1.755)	(0.756)		
Population Density (LN)	0.0724***	0.0751***	0.0628***	0.0667***
	(5.918)	(6.039)	(5.128)	(5.340)
Below Poverty (%)		-0.0023		-0.0032
		(-1.055)		(-1.488)
Owner Occupied Units (%)		-0.0023*		-0.0019*
		(-2.487)		(-2.149)
Constant	2.8091***	2.9572***	2.8572***	2.9799***
	(32.831)	(28.553)	(33.430)	(28.895)
Observations	616	616	616	616
R-squared	0.115	0.124	0.134	0.141
F	39.7051	21.5977	23.6290	16.6080
Log-likelihood	-278.7710	-275.5570	-271.9893	-269.6152
Akaike Info Coefficient	563.5421	561.1139	553.9786	553.2304
Moran's I-Queen	0.8772***	0.8719***	0.8705***	0.8670***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 88

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Pilgrim Nuclear Power Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0001	-0.0001
			(-0.225)	(-0.292)
Asian (%)			0.0001	0.0001
			(0.197)	(0.095)
Hispanic (%)			0.0000	-0.0000
			(0.083)	(-0.023)
Color (%)	-0.0000	-0.0001		
	(-0.240)	(-0.416)		
Population Density (LN)	0.0027	0.0030	0.0024	0.0027
	(0.885)	(0.949)	(0.755)	(0.829)
Below Poverty (%)		-0.0002		-0.0002
		(-0.353)		(-0.400)
Owner Occupied Units (%)		-0.0002		-0.0002
		(-0.789)		(-0.730)
Constant	0.0933**	0.1065**	0.0962**	0.1080**
	(2.953)	(2.977)	(2.988)	(2.990)
Spatial Autoregressive Coefficient (Rho)	0.9681***	0.9676***	0.9678***	0.9674***
	(116.424)	(115.549)	(115.192)	(114.543)
Observations	616	616	616	616
R-squared	0.9448	0.9448	0.9448	0.9448
Log-likelihood Queen	481.6306	481.9503	481.6500	481.9167
Akaike Info Coefficient	-966.26	-951.90	-947.84	-951.30
Moran's I-Queen	0.0013	0.003	0.001	0.003

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

25. Donald C. Cook Nuclear Power Plant, Michigan and 27. Palisades Nuclear Plant, Michigan

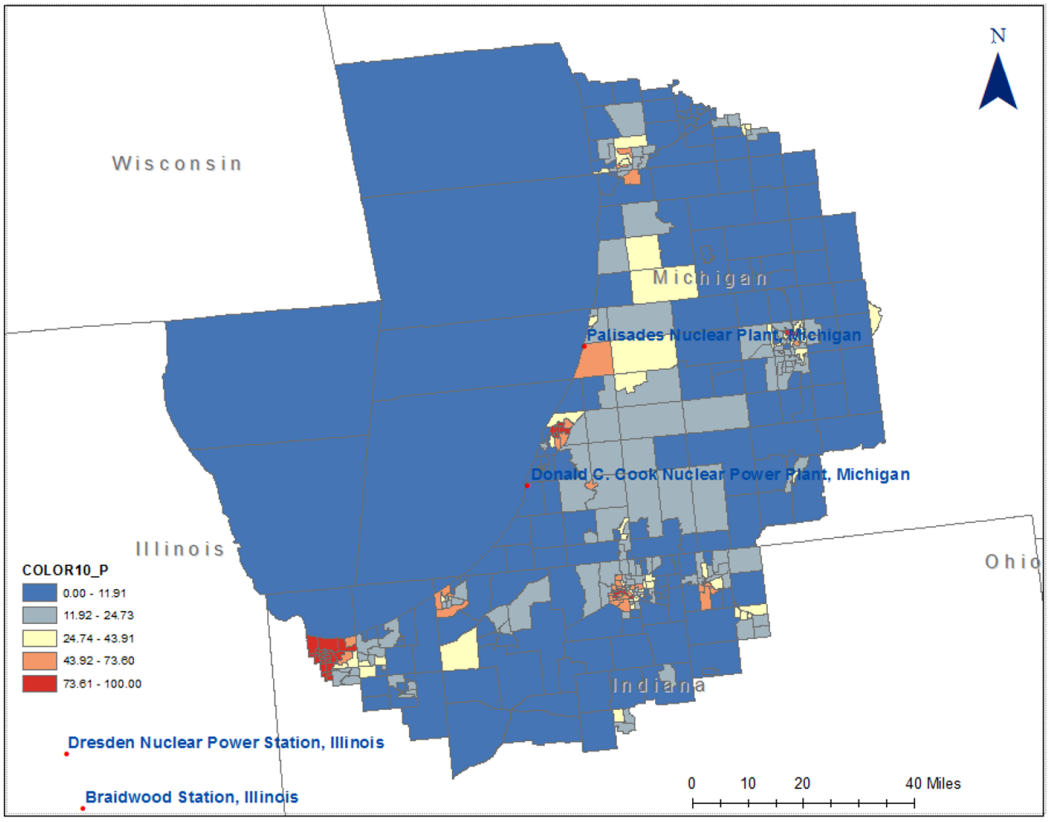

Figure C. 23 Spatial distribution of percent Color among the populations surrounding Donald C. Cook Nuclear Power Plant and Palisades Nuclear Plant

Table C. 89

*Descriptive Statistics for Study Variables at Donald C. Cook Nuclear Power Plant and Palisades Nuclear Plan*t

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.393	0.516	1.049	3.911
Black (%)	14.417	25.342	0.000	100.000
Asian (%)	1.362	2.300	0.000	17.910
Hispanic (%)	6.861	8.359	0.000	61.511
Color (%)	24.761	26.414	0.000	100.000
Population Density (LN)	6.476	1.751	0.000	8.975
Below Poverty (%)	16.192	13.750	0.000	70.423
Owner Occupied Units (%)	62.086	22.112	0.000	100.000
Observations	430			

Table C. 90

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Donald C. Cook Nuclear Power Plant and Palisades Nuclear Plant

	rho	p	count
Black (%)	0.0384	0.4276	430
Asian (%)	0.0143	0.7675	430
Hispanic (%)	0.0378	0.4345	430
Color (%)	0.0446	0.3562	430
Population Density (LN)	0.0880	0.0682	430
Below Poverty (%)	-0.0228	0.6368	430
Owner Occupied Units (%)	0.0621	0.1984	430

Table C. 91

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Donald C. Cook Nuclear Power Plant and Palisades Nuclear Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0002	0.0026+
			(0.157)	(1.716)
Asian (%)			-0.0003	0.0013
			(-0.028)	(0.111)
Hispanic (%)			0.0012	0.0034
			(0.389)	(1.055)
Color (%)	0.0001	0.0024		
	(0.070)	(1.609)		
Population Density (LN)	0.0254	0.0244	0.0237	0.0242
	(1.576)	(1.446)	(1.436)	(1.386)
Below Poverty (%)		-0.0044		-0.0046
		(-1.415)		(-1.492)
Owner Occupied Units (%)		0.0014		0.0014
		(0.963)		(0.954)
Constant	3.2262***	3.1571***	3.2285***	3.1599***
	(32.899)	(24.029)	(32.740)	(23.970)
Observations	430	430	430	430
R-squared	0.008	0.019	0.008	0.021
F	1.6700	2.0933	0.8713	1.5062
Log-likelihood	-323.6524	-321.1328	-323.5717	-320.7827
Akaike Info Coefficient	653.3047	652.2656	657.1433	655.5653
Moran's I-Queen	0.8844***	0.8841***	0.8726***	0.8736***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 92

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Donald C. Cook Nuclear Power Plant and Palisades Nuclear Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0002	0.0002
			(0.740)	(0.521)
Asian (%)			0.0027	0.0021
			(1.049)	(0.795)
Hispanic (%)			-0.0006	-0.0005
			(-0.769)	(-0.714)
Color (%)	0.0001	0.0001		
	(0.431)	(0.324)		
Population Density (LN)	-0.0121**	-0.0101*	-0.0125**	-0.0104*
	(-3.230)	(-2.557)	(-3.262)	(-2.556)
Below Poverty (%)		-0.0008		-0.0007
		(-1.115)		(-1.026)
Owner Occupied Units (%)		-0.0006+		-0.0005
		(-1.705)		(-1.572)
Constant	0.1154***	0.1495***	0.1170***	0.1484***
	(3.767)	(4.132)	(3.835)	(4.110)
Spatial Autoregressive Coefficient (Rho)	0.9886***	0.9890***	0.9888***	0.9892***
	(152.029)	(154.941)	(153.808)	(156.331)
Observations	430	430	430	430
R-squared	0.9460	0.9464	0.9462	0.9466
Log-likelihood Queen	228.8301	230.3683	229.8204	231.1170
Akaike Info Coefficient	-449.66	-448.74	-447.64	-446.23
Moran's I-Queen	0.0855***	0.0862***	0.0848***	0.0859***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

26. Fermi, Michigan

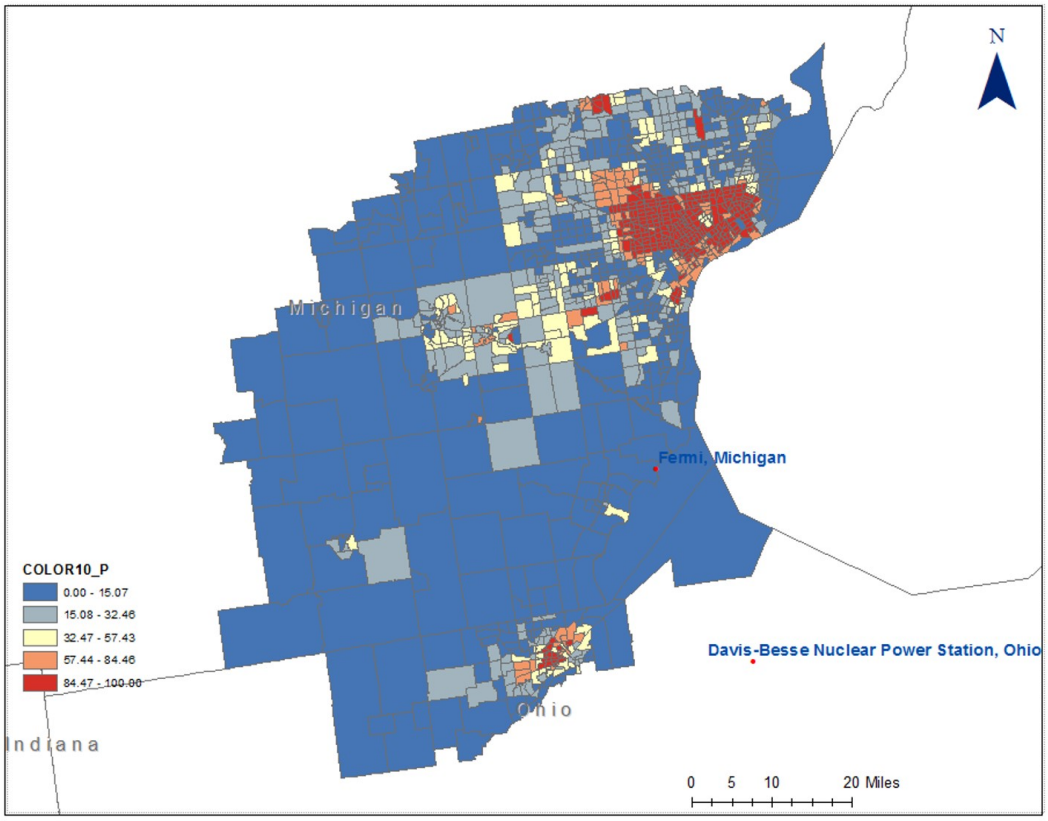

Figure C. 24 Spatial distribution of percent Color among the populations surrounding Fermi

Table C. 93
Descriptive Statistics for Study Variables at Fermi

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.446	0.350	1.061	3.912
Black (%)	29.533	36.636	0.000	100.000
Asian (%)	3.315	6.192	0.000	65.070
Hispanic (%)	4.150	9.146	0.000	100.000
Color (%)	38.971	35.219	0.000	100.000
Population Density (LN)	7.912	1.309	0.000	9.910
Below Poverty (%)	17.689	16.339	0.000	89.320
Owner Occupied Units (%)	60.328	24.693	0.000	100.000
Observations	1312			

Table C. 94
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Fermi

	rho	p	count
Black (%)	0.0404	0.1433	1312
Asian (%)	0.1514	0.0000	1312
Hispanic (%)	-0.1323	0.0000	1312
Color (%)	0.0315	0.2541	1312
Population Density (LN)	0.1367	0.0000	1312
Below Poverty (%)	-0.0646	0.0192	1312
Owner Occupied Units (%)	0.0737	0.0075	1312

Table C. 95

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Fermi

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0001	0.0013***
			(0.443)	(3.435)
Asian (%)			0.0080***	0.0090***
			(5.031)	(5.605)
Hispanic (%)			-0.0048***	-0.0030**
			(-4.616)	(-2.700)
Color (%)	-0.0002	0.0012**		
	(-0.619)	(3.143)		
Population Density (LN)	0.0382***	0.0412***	0.0350***	0.0359***
	(4.900)	(5.146)	(4.577)	(4.536)
Below Poverty (%)		-0.0037***		-0.0025**
		(-3.901)		(-2.599)
Owner Occupied Units (%)		0.0006		0.0010+
		(1.070)		(1.860)
Constant	3.1509***	3.1018***	3.1589***	3.0873***
	(52.956)	(46.472)	(53.982)	(46.742)
Observations	1312	1312	1312	1312
R-squared	0.019	0.039	0.057	0.072
F	12.6665	13.4005	19.6091	16.7644
Log-likelihood	-469.8695	-456.0772	-444.2116	-433.7348
Akaike Info Coefficient	945.7389	922.1545	898.4231	881.4696
Moran's I-Queen	0.9621***	0.9487***	0.9472***	0.9377***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 96

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Fermi

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0000	-0.0000
			(-0.849)	(-0.449)
Asian (%)			0.0000	0.0001
			(0.021)	(0.328)
Hispanic (%)			0.0000	0.0000
			(0.043)	(0.077)
Color (%)	-0.0000	-0.0000		
	(-0.925)	(-0.573)		
Population Density (LN)	0.0007	0.0004	0.0007	0.0003
	(0.909)	(0.488)	(0.861)	(0.406)
Below Poverty (%)		0.0001		0.0001
		(1.090)		(1.074)
Owner Occupied Units (%)		0.0001		0.0001
		(1.469)		(1.552)
Constant	0.0006	-0.0040	0.0005	-0.0043
	(0.089)	(-0.521)	(0.077)	(-0.567)
Spatial Autoregressive Coefficient (Rho)	0.9986***	0.9986***	0.9986***	0.9986***
	(898.106)	(903.148)	(898.717)	(893.154)
Observations	1312	1312	1312	1312
R-squared	0.9901	0.9901	0.9901	0.9901
Log-likelihood Queen	2326.7569	2327.9146	2326.7455	2327.9969
Akaike Info Coefficient	-4645.75	-4644.08	-4641.73	-4640.23
Moran's I-Queen	0.1188***	0.1871***	0.1883***	0.1874***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

28. Monticello Nuclear Generating Plant, Minnesota

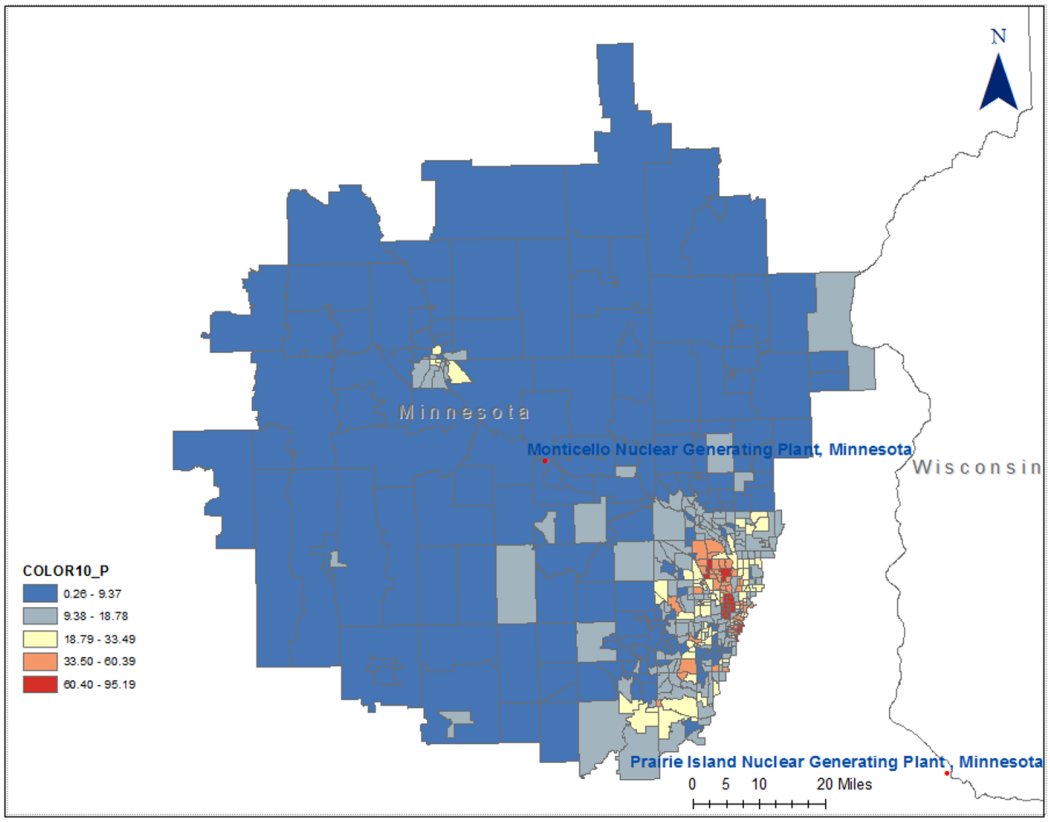

Figure C. 25 Spatial distribution of percent Color among the populations surrounding Monticello Nuclear Generating Plant

Table C. 97

Descriptive Statistics for Study Variables at Monticello Nuclear Generating Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.420	0.357	0.641	3.901
Black (%)	7.861	12.417	0.000	71.563
Asian (%)	4.492	5.434	0.000	41.075
Hispanic (%)	4.670	6.444	0.000	58.202
Color (%)	19.609	20.014	0.255	95.192
Population Density (LN)	7.281	1.619	2.327	10.162
Below Poverty (%)	10.594	11.407	0.000	67.105
Owner Occupied Units (%)	68.728	22.285	3.700	100.000
Observations	456			

Table C. 98

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Monticello Nuclear Generating Plant

	rho	p	count
Black (%)	0.1634	0.0005	456
Asian (%)	0.1553	0.0009	456
Hispanic (%)	0.1803	0.0001	456
Color (%)	0.2125	0.0000	456
Population Density (LN)	0.2531	0.0000	456
Below Poverty (%)	0.1162	0.0131	456
Owner Occupied Units (%)	-0.1855	0.0001	456

Table C. 99

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Monticello Nuclear Generating Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0003	0.0008
			(-0.200)	(0.363)
Asian (%)			0.0054	0.0056
			(1.559)	(1.596)
Hispanic (%)			0.0058*	0.0063*
			(2.040)	(2.124)
Color (%)	0.0019+	0.0028*		
	(1.912)	(2.241)		
Population Density (LN)	0.0431***	0.0364**	0.0421***	0.0358**
	(3.591)	(2.901)	(3.561)	(2.885)
Below Poverty (%)		-0.0048+		-0.0042+
		(-1.961)		(-1.680)
Owner Occupied Units (%)		-0.0020+		-0.0020+
		(-1.816)		(-1.804)
Constant	3.0701***	3.2874***	3.0646***	3.2806***
	(38.349)	(23.253)	(38.310)	(23.169)
Observations	456	456	456	456
R-squared	0.072	0.081	0.078	0.086
F	17.4626	9.9285	9.5610	7.0609
Log-likelihood	-159.9050	-157.5967	-158.2807	-156.2808
Akaike Info Coefficient	325.8100	325.1935	326.5614	326.5615
Moran's I-Queen	0.8701***	0.8613***	0.8642***	0.8579***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 100

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Monticello Nuclear Generating Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0001	-0.0002
			(0.200)	(-0.397)
Asian (%)			0.0005	0.0006
			(0.701)	(0.804)
Hispanic (%)			0.0007	0.0006
			(1.215)	(0.911)
Color (%)	0.0002	0.0001		
	(1.139)	(0.267)		
Population Density (LN)	-0.0043+	-0.0048+	-0.0046+	-0.0052*
	(-1.714)	(-1.849)	(-1.875)	(-2.037)
Below Poverty (%)		0.0002		0.0002
		(0.410)		(0.433)
Owner Occupied Units (%)		-0.0002		-0.0002
		(-0.686)		(-0.687)
Constant	0.0398*	0.0554+	0.0408*	0.0561+
	(2.106)	(1.793)	(2.152)	(1.812)
Spatial Autoregressive Coefficient (Rho)	0.9966***	0.9966***	0.9965***	0.9966***
	(334.917)	(337.040)	(330.882)	(332.016)
Observations	456	456	456	456
R-squared	0.9598	0.9599	0.9599	0.9600
Log-likelihood Queen	473.8316	474.5300	474.4614	475.1526
Akaike Info Coefficient	-939.66	-937.06	-936.92	-934.31
Moran's I-Queen	0.1696***	0.1708***	0.169***	0.157***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

29. Prairie Island Nuclear Generating Plant, Minnesota

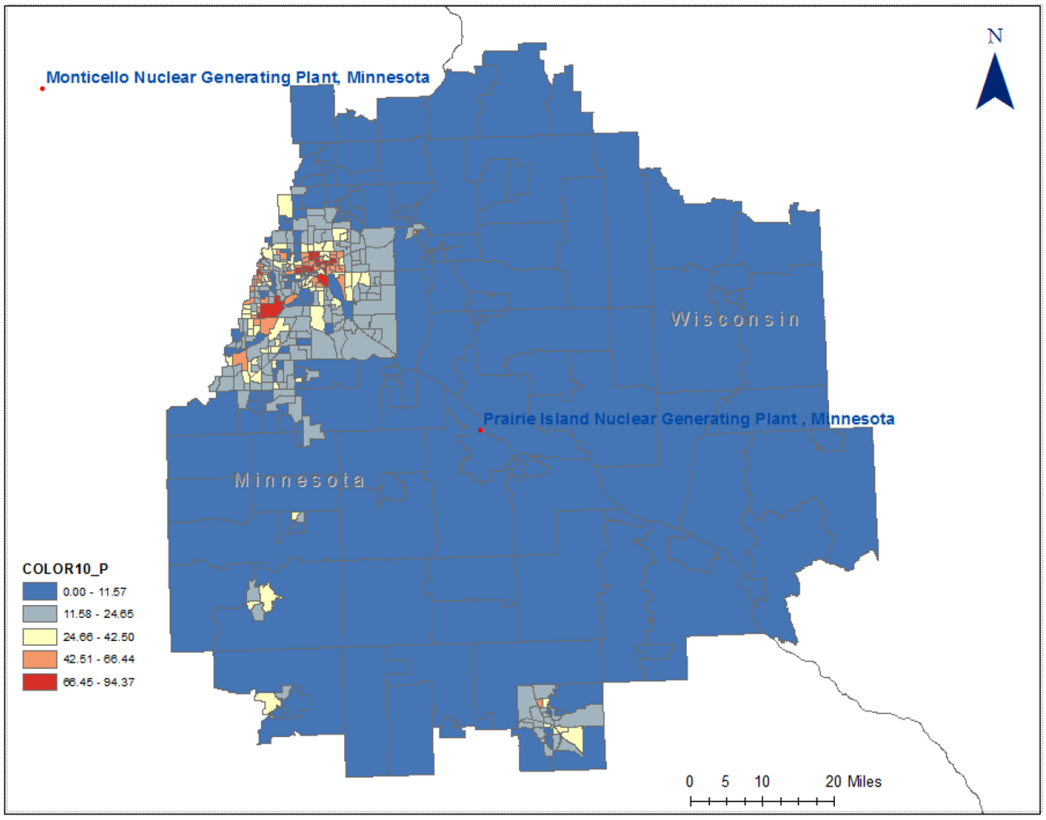

Figure C. 26 Spatial distribution of percent Color among the populations surrounding Prairie Island Nuclear Generating Plant

Table C. 101

Descriptive Statistics for Study Variables at Prairie Island Nuclear Generating Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.451	0.317	0.568	3.909
Black (%)	6.983	10.017	0.000	83.734
Asian (%)	5.999	7.883	0.000	51.098
Hispanic (%)	5.850	6.757	0.000	42.759
Color (%)	21.564	19.386	0.000	94.367
Population Density (LN)	7.326	1.659	0.000	9.862
Below Poverty (%)	11.411	11.763	0.000	74.549
Owner Occupied Units (%)	67.108	21.317	0.000	100.000
Observations	448			

Table C. 102

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Prairie Island Nuclear Generating Plant

	rho	p	count
Black (%)	0.1036	0.0283	448
Asian (%)	0.0906	0.0553	448
Hispanic (%)	0.0842	0.0751	448
Color (%)	0.1284	0.0065	448
Population Density (LN)	0.1763	0.0002	448
Below Poverty (%)	0.1270	0.0071	448
Owner Occupied Units (%)	-0.1196	0.0113	448

Table C. 103

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Prairie Island Nuclear Generating Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0010	-0.0004
			(0.553)	(-0.194)
Asian (%)			0.0008	0.0001
			(0.400)	(0.035)
Hispanic (%)			0.0010	0.0005
			(0.439)	(0.192)
Color (%)	0.0008	-0.0001		
	(0.954)	(-0.095)		
Population Density (LN)	0.0286**	0.0286**	0.0287**	0.0281**
	(2.763)	(2.755)	(2.805)	(2.746)
Below Poverty (%)		0.0015		0.0015
		(0.741)		(0.728)
Owner Occupied Units (%)		-0.0005		-0.0005
		(-0.512)		(-0.500)
Constant	3.2226***	3.2619***	3.2229***	3.2621***
	(46.229)	(28.910)	(46.270)	(28.638)
Observations	448	448	448	448
R-squared	0.033	0.037	0.033	0.037
F	7.6083	4.2286	3.8183	2.8173
Log-likelihood	-112.8111	-111.9491	-112.7499	-111.9170
Akaike Info Coefficient	231.6221	233.8982	235.4998	237.8340
Moran's I-Queen	0.8321***	0.8294***	0.8322***	0.8294***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 104

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Prairie Island Nuclear Generating Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0002	-0.0002
			(-0.329)	(-0.335)
Asian (%)			-0.0001	-0.0001
			(-0.211)	(-0.210)
Hispanic (%)			-0.0000	-0.0000
			(-0.003)	(-0.031)
Color (%)	-0.0002	-0.0002		
	(-0.595)	(-0.583)		
Population Density (LN)	0.0026	0.0026	0.0022	0.0022
	(0.778)	(0.773)	(0.686)	(0.677)
Below Poverty (%)		0.0000		-0.0000
		(0.013)		(-0.035)
Owner Occupied Units (%)		-0.0001		-0.0000
		(-0.199)		(-0.150)
Constant	0.0842*	0.0899+	0.0855*	0.0898+
	(2.017)	(1.773)	(2.047)	(1.765)
Spatial Autoregressive Coefficient (Rho)	0.9722***	0.9721***	0.9721***	0.9721***
	(88.625)	(88.416)	(88.511)	(88.359)
Observations	448	448	448	448
R-squared	0.9018	0.9018	0.9018	0.9018
Log-likelihood Queen	329.5759	329.6059	329.5113	329.5240
Akaike Info Coefficient	-651.15	-647.21	-647.02	-643.05
Moran's I-Queen	0.0409*	0.0411*	0.0406*	0.0406*

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

30. Grand Gulf Nuclear Station, Mississippi

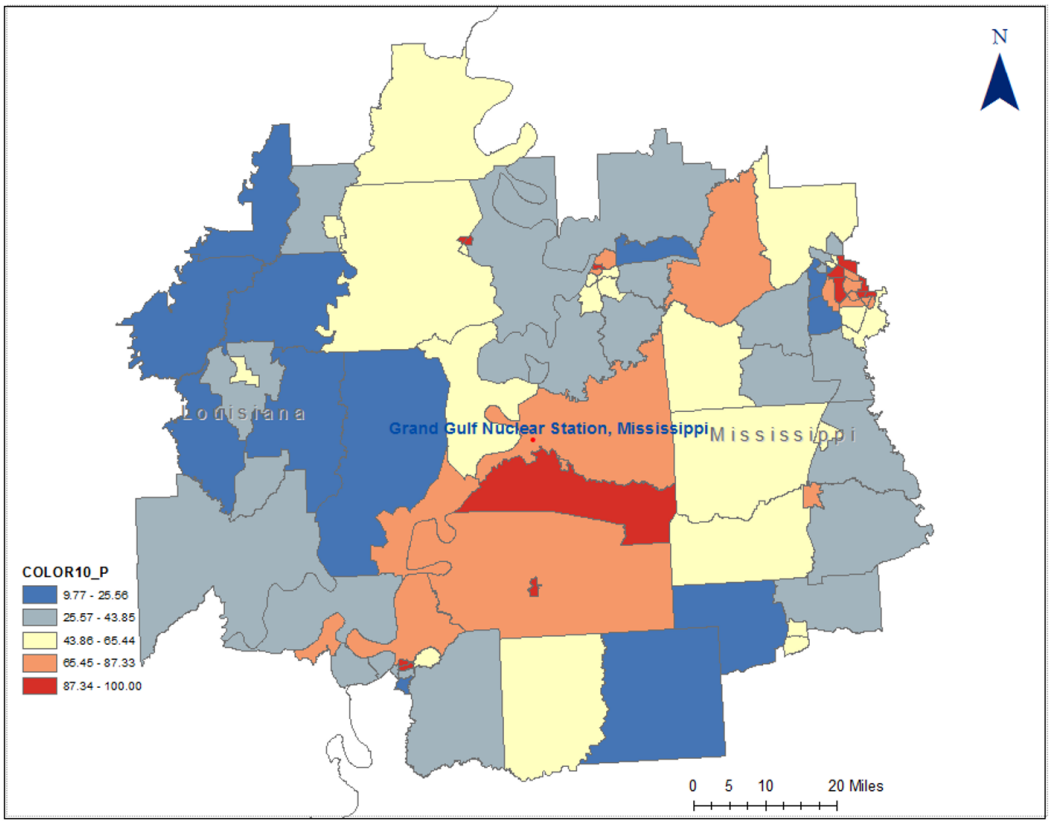

Figure C. 27 Spatial distribution of percent Color among the populations surrounding Grand Gulf Nuclear Station

Table C. 105
Descriptive Statistics for Study Variables at Grand Gulf Nuclear Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.536	0.424	1.678	3.907
Black (%)	53.445	26.371	6.432	100.000
Asian (%)	0.653	1.805	0.000	11.648
Hispanic (%)	1.430	2.261	0.000	11.814
Color (%)	56.181	25.850	9.771	100.000
Population Density (LN)	5.251	2.008	1.163	8.493
Below Poverty (%)	24.045	12.189	2.502	57.883
Owner Occupied Units (%)	57.911	15.057	18.491	84.647
Observations	89			

Table C. 106
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Grand Gulf Nuclear Station

	rho	p	count
Black (%)	-0.1698	0.1117	89
Asian (%)	0.1143	0.2861	89
Hispanic (%)	0.0680	0.5264	89
Color (%)	-0.1556	0.1453	89
Population Density (LN)	0.2583	0.0145	89
Below Poverty (%)	-0.2246	0.0344	89
Owner Occupied Units (%)	0.0539	0.6159	89

Table C. 107

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Grand Gulf Nuclear Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0061**	-0.0049*
			(-3.186)	(-2.018)
Asian (%)			-0.0127	-0.0203
			(-0.497)	(-0.738)
Hispanic (%)			-0.0015	-0.0029
			(-0.080)	(-0.144)
Color (%)	-0.0060**	-0.0046+		
	(-3.273)	(-1.962)		
Population Density (LN)	0.0924***	0.0846**	0.0935***	0.0877**
	(3.888)	(3.386)	(3.658)	(3.370)
Below Poverty (%)		-0.0064		-0.0072
		(-1.209)		(-1.290)
Owner Occupied Units (%)		-0.0023		-0.0031
		(-0.567)		(-0.686)
Constant	3.3901***	3.6416***	3.3826***	3.7095***
	(27.259)	(9.532)	(26.901)	(8.754)
Observations	89	89	89	89
R-squared	0.170	0.184	0.172	0.189
F	8.8123	4.7480	4.3637	3.1768
Log-likelihood	-41.2192	-40.4446	-41.1138	-40.2146
Akaike Info Coefficient	88.4385	90.8892	92.2276	94.4291
Moran's I-Queen	0.5851***	0.5793***	0.5825***	0.5728***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 108

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Grand Gulf Nuclear Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0019*	-0.0017+
			(-2.571)	(-1.842)
Asian (%)			-0.0088	-0.0147
			(-0.899)	(-1.421)
Hispanic (%)			-0.0011	-0.0034
			(-0.148)	(-0.456)
Color (%)	-0.0018*	-0.0014		
	(-2.431)	(-1.529)		
Population Density (LN)	0.0123	0.0082	0.0144	0.0113
	(1.298)	(0.840)	(1.438)	(1.134)
Below Poverty (%)		-0.0028		-0.0035
		(-1.347)		(-1.642)
Owner Occupied Units (%)		-0.0018		-0.0026
		(-1.113)		(-1.500)
Constant	0.1650+	0.3336*	0.1633+	0.4050*
	(1.744)	(1.977)	(1.739)	(2.261)
Spatial Autoregressive Coefficient (Rho)	0.9662***	0.9662***	0.9665***	0.9670***
	(39.681)	(39.691)	(39.946)	(40.445)
Observations	89	89	89	89
R-squared	0.8697	0.8725	0.8708	0.8753
Log-likelihood Queen	24.9121	25.9091	25.2640	26.8021
Akaike Info Coefficient	-41.82	-39.82	-38.53	-37.60
Moran's I-Queen	0.2781***	0.3058***	0.2645***	0.2949***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

31. Callaway Plant, Missouri

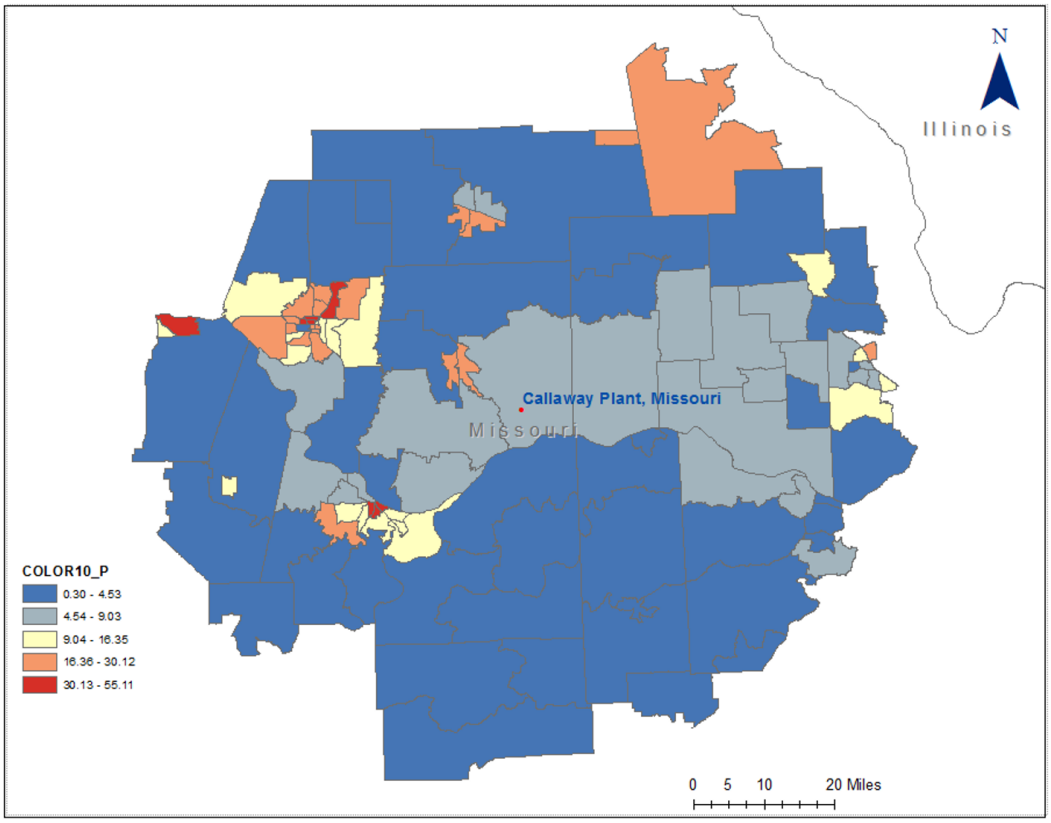

Figure C. 28 Spatial distribution of percent Color among the populations surrounding Callaway Plant

Table C. 109
Descriptive Statistics for Study Variables at Callaway Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.450	0.383	1.683	3.904
Black (%)	5.723	8.573	0.000	49.012
Asian (%)	1.389	2.763	0.000	21.212
Hispanic (%)	2.188	2.289	0.000	16.520
Color (%)	11.350	11.397	0.296	55.114
Population Density (LN)	5.312	1.797	2.524	9.254
Below Poverty (%)	14.124	11.851	0.323	66.562
Owner Occupied Units (%)	63.734	18.925	0.670	93.843
Observations	113			

Table C. 110
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Callaway Plant

	rho	p	count
Black (%)	-0.0540	0.5703	113
Asian (%)	-0.0386	0.6848	113
Hispanic (%)	0.0006	0.9946	113
Color (%)	-0.0548	0.5641	113
Population Density (LN)	0.0913	0.3364	113
Below Poverty (%)	-0.1014	0.2851	113
Owner Occupied Units (%)	0.1748	0.0640	113

Table C. 111

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Callaway Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0064	-0.0023
			(-1.316)	(-0.432)
Asian (%)			-0.0198	-0.0086
			(-1.276)	(-0.496)
Hispanic (%)			-0.0078	-0.0019
			(-0.448)	(-0.109)
Color (%)	-0.0063	-0.0020		
	(-1.551)	(-0.444)		
Population Density (LN)	0.0449+	0.0595*	0.0540+	0.0627*
	(1.734)	(2.294)	(1.898)	(2.226)
Below Poverty (%)		0.0063		0.0068
		(1.068)		(1.110)
Owner Occupied Units (%)		0.0091*		0.0091*
		(2.355)		(2.308)
Constant	3.2832***	2.4873***	3.2442***	2.4728***
	(27.493)	(6.837)	(25.497)	(6.692)
Observations	113	113	113	113
R-squared	0.030	0.088	0.036	0.089
F	1.6745	2.6021	1.0186	1.7281
Log-likelihood	-49.7018	-46.1978	-49.3040	-46.1234
Akaike Info Coefficient	105.4035	102.3955	108.6080	106.2468
Moran's I-Queen	0.7585***	0.7271***	0.7505***	0.7257***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 112

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Callaway Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0013	-0.0002
			(-0.753)	(-0.101)
Asian (%)			-0.0052	-0.0017
			(-0.957)	(-0.279)
Hispanic (%)			-0.0078	-0.0069
			(-1.274)	(-1.121)
Color (%)	-0.0020	-0.0010		
	(-1.392)	(-0.636)		
Population Density (LN)	0.0072	0.0099	0.0102	0.0114
	(0.777)	(1.050)	(1.017)	(1.131)
Below Poverty (%)		0.0001		-0.0002
		(0.031)		(-0.094)
Owner Occupied Units (%)		0.0012		0.0011
		(0.867)		(0.806)
Constant	0.1092	0.0145	0.1004	0.0191
	(1.326)	(0.101)	(1.216)	(0.133)
Spatial Autoregressive Coefficient (Rho)	0.9677***	0.9649***	0.9681***	0.9659***
	(44.937)	(42.456)	(45.271)	(43.187)
Observations	113	113	113	113
R-squared	0.8748	0.8761	0.8759	0.8772
Log-likelihood Queen	45.8430	46.7175	46.2938	47.1547
Akaike Info Coefficient	-83.69	-81.44	-80.59	-78.31
Moran's I-Queen	0.1532***	0.1523***	0.1448***	0.1448***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

32. Cooper Nuclear Station, Nebraska

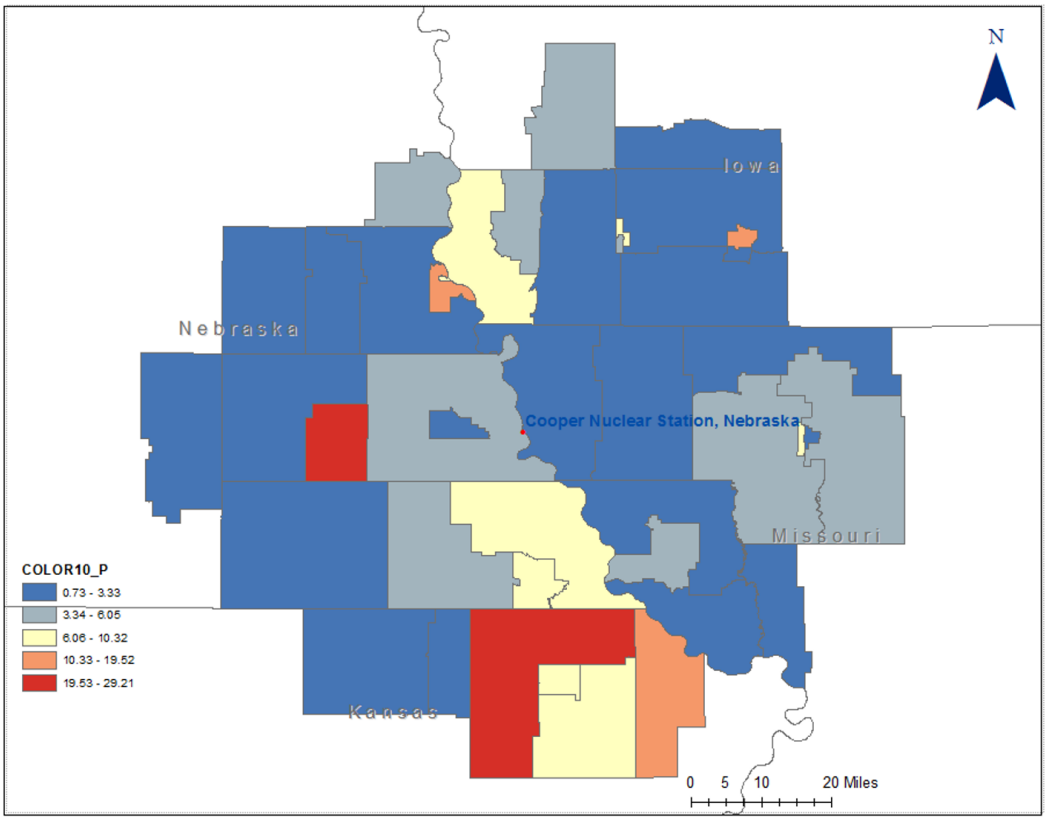

Figure C. 29 Spatial distribution of percent Color among the populations surrounding Cooper Nuclear Station

Table C. 113 Descriptive Statistics for Study Variables at Cooper Nuclear Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.406	0.439	2.022	3.892
Black (%)	1.034	2.443	0.000	11.989
Asian (%)	0.449	0.788	0.000	3.023
Hispanic (%)	2.168	2.835	0.000	13.713
Color (%)	5.909	6.245	0.733	29.206
Population Density (LN)	3.467	1.705	1.855	8.104
Below Poverty (%)	13.103	6.002	4.858	32.147
Owner Occupied Units (%)	65.143	9.015	35.076	83.229
Observations	43			

Table C. 114 Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Cooper Nuclear Station

	rho	p	count
Black (%)	0.1271	0.4168	43
Asian (%)	0.0980	0.5319	43
Hispanic (%)	-0.0344	0.8265	43
Color (%)	0.0664	0.6724	43
Population Density (LN)	0.0739	0.6377	43
Below Poverty (%)	0.0277	0.8599	43
Owner Occupied Units (%)	0.1317	0.4000	43

Table C. 115 Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Cooper Nuclear Station

Index_32

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0288	0.0232
			(0.890)	(0.705)
Asian (%)			0.0261	0.0749
			(0.279)	(0.779)
Hispanic (%)			-0.0203	-0.0165
			(-0.679)	(-0.558)
Color (%)	0.0039	0.0015		
	(0.344)	(0.128)		
Population Density (LN)	0.0165	0.0528	0.0215	0.0611
	(0.401)	(1.029)	(0.472)	(1.129)
Below Poverty (%)		0.0163		0.0143
		(0.885)		(0.797)
Owner Occupied Units (%)		0.0207+		0.0226+
		(1.688)		(1.786)
Constant	3.3263***	1.6543	3.3342***	1.5140
	(20.585)	(1.628)	(21.014)	(1.438)
Observations	43	43	43	43
R-squared	0.008	0.079	0.036	0.117
F	0.1694	0.8114	0.3517	0.7975
Log-likelihood	-24.9054	-23.3247	-24.3052	-22.4034
Akaike Info Coefficient	55.8108	56.6493	58.6104	58.8069
Moran's I-Queen	0.4953***	0.4479***	0.4733***	0.4009***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 116 Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Cooper Nuclear Station

Index_32 Lag

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0161	0.0126
			(0.785)	(0.615)
Asian (%)			-0.0013	0.0305
			(-0.023)	(0.511)
Hispanic (%)			-0.0037	-0.0014
			(-0.194)	(-0.076)
Color (%)	0.0035	0.0022		
	(0.482)	(0.290)		
Population Density (LN)	-0.0058	0.0200	-0.0055	0.0203
	(-0.219)	(0.620)	(-0.190)	(0.599)
Below Poverty (%)		0.0099		0.0094
		(0.855)		(0.841)
Owner Occupied Units (%)		0.0137+		0.0146+
		(1.778)		(1.854)
Constant	0.6514+	-0.4301	0.6753+	-0.4694
	(1.899)	(-0.627)	(1.944)	(-0.671)
Spatial Autoregressive Coefficient (Rho)	0.8185***	0.8120***	0.8148***	0.8043***
	(8.177)	(8.051)	(7.992)	(7.750)
Observations	43	43	43	43
R-squared	0.5634	0.5924	0.5663	0.5967
Log-likelihood Queen	-12.0458	-10.4514	-11.8359	-10.0946
Akaike Info Coefficient	32.09	32.90	35.67	36.19
Moran's I-Queen	0.2236*	0.1849*	0.2251***	0.1637*

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

33. Fort Calhoun Station, Nebraska

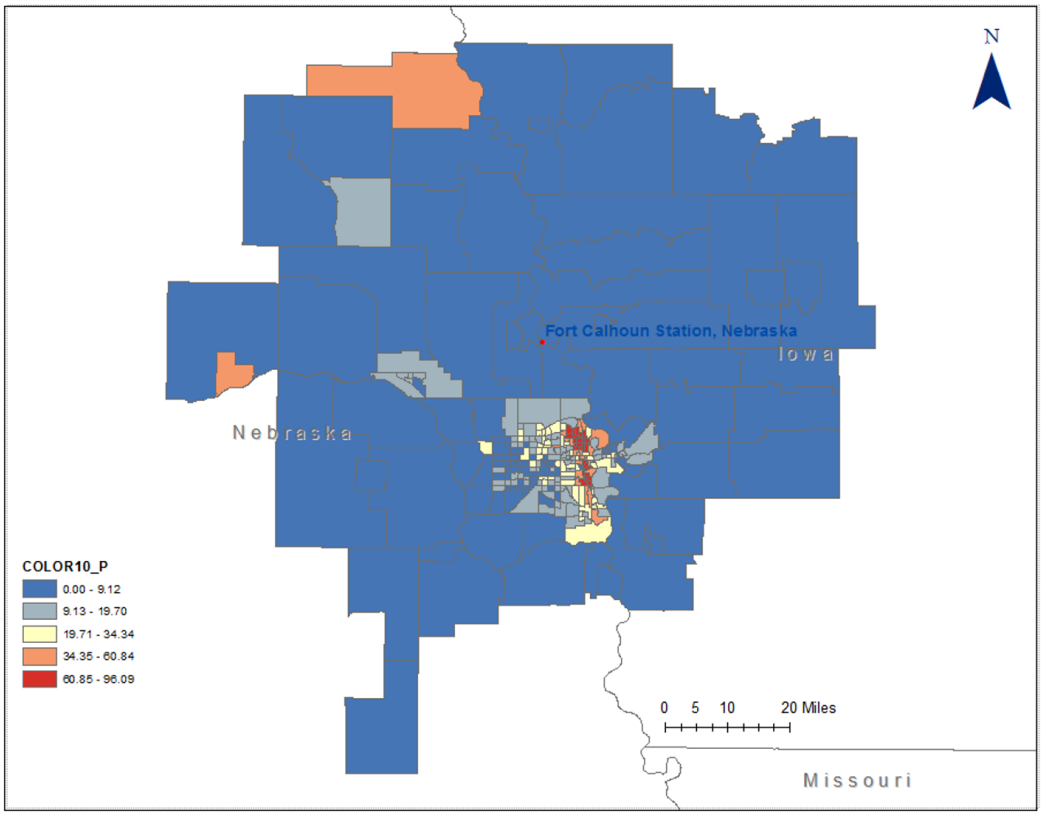

Figure C. 30 Spatial distribution of percent Color among the populations surrounding Fort Calhoun Station

Table C. 117
Descriptive Statistics for Study Variables at Fort Calhoun Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.101	0.354	1.138	3.911
Black (%)	7.860	16.338	0.000	81.562
Asian (%)	1.710	2.350	0.000	15.492
Hispanic (%)	8.363	12.818	0.000	74.118
Color (%)	20.678	21.795	0.000	96.091
Population Density (LN)	6.980	1.995	1.670	9.513
Below Poverty (%)	12.089	11.535	0.000	85.000
Owner Occupied Units (%)	63.642	20.594	0.000	98.375
Observations	282			

Table C. 118
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Fort Calhoun Station

	rho	p	count
Black (%)	-0.2530	0.0000	282
Asian (%)	-0.1105	0.0638	282
Hispanic (%)	0.0356	0.5519	282
Color (%)	-0.1858	0.0017	282
Population Density (LN)	-0.3713	0.0000	282
Below Poverty (%)	-0.1179	0.0479	282
Owner Occupied Units (%)	0.0514	0.3902	282

Table C. 119

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Fort Calhoun Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0032*	-0.0035*
			(-2.541)	(-2.163)
Asian (%)			0.0036	0.0015
			(0.402)	(0.166)
Hispanic (%)			0.0040*	0.0034+
			(2.450)	(1.900)
Color (%)	-0.0005	-0.0004		
	(-0.534)	(-0.321)		
Population Density (LN)	-0.0633***	-0.0668***	-0.0671***	-0.0688***
	(-5.811)	(-6.047)	(-5.853)	(-5.939)
Below Poverty (%)		-0.0032		-0.0014
		(-1.128)		(-0.499)
Owner Occupied Units (%)		-0.0025+		-0.0020
		(-1.886)		(-1.582)
Constant	3.5542***	3.7714***	3.5554***	3.7245***
	(49.049)	(27.827)	(49.319)	(27.786)
Observations	282	282	282	282
R-squared	0.139	0.150	0.180	0.188
F	22.4777	12.2016	15.2129	10.6084
Log-likelihood	-85.3638	-83.5460	-78.4272	-77.0727
Akaike Info Coefficient	176.7276	177.0921	166.8545	168.1453
Moran's I-Queen	0.8115***	0.8015***	0.7912***	0.7853***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 120

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Fort Calhoun Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0003	0.0001
			(0.740)	(0.255)
Asian (%)			0.0032	0.0030
			(1.144)	(1.040)
Hispanic (%)			0.0003	0.0002
			(0.605)	(0.336)
Color (%)	0.0003	0.0002		
	(0.961)	(0.446)		
Population Density (LN)	-0.0104**	-0.0103**	-0.0114**	-0.0113**
	(-3.072)	(-2.997)	(-3.160)	(-3.076)
Below Poverty (%)		0.0002		0.0004
		(0.276)		(0.418)
Owner Occupied Units (%)		-0.0000		0.0000
		(-0.076)		(0.018)
Constant	0.1142**	0.1150*	0.1173**	0.1139*
	(2.643)	(2.007)	(2.693)	(1.988)
Spatial Autoregressive Coefficient (Rho)	0.9851***	0.9851***	0.9851***	0.9851***
	(92.608)	(92.422)	(92.109)	(91.946)
Observations	282	282	282	282
R-squared	0.9191	0.9191	0.9193	0.9194
Log-likelihood Queen	202.9382	203.0081	203.3335	203.4487
Akaike Info Coefficient	-397.89	-394.02	-394.67	-390.90
Moran's I-Queen	0.023	0.0223	0.0229	0.0216

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

34. Seabrook Station, New Hampshire

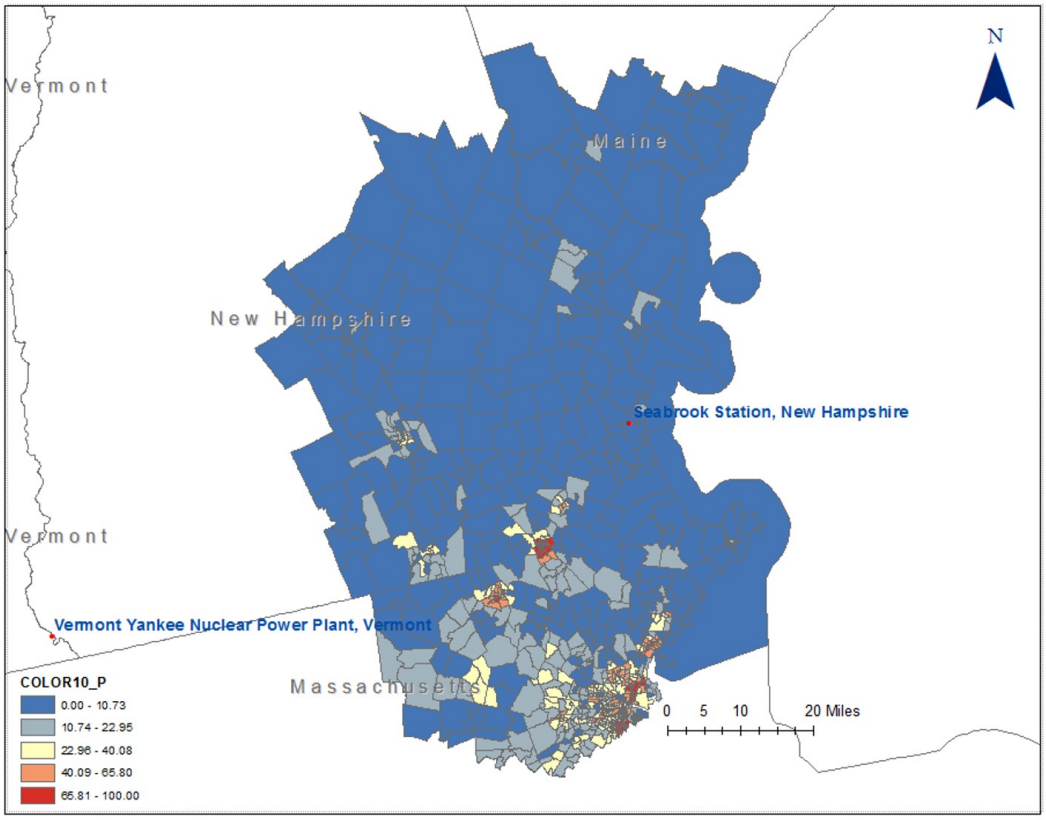

Figure C. 31 Spatial distribution of percent Color among the populations surrounding Seabrook Station

Table C. 121
Descriptive Statistics for Study Variables at Seabrook Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.406	0.479	0.107	3.912
Black (%)	4.667	9.273	0.000	82.266
Asian (%)	6.291	7.676	0.000	66.281
Hispanic (%)	9.577	15.952	0.000	100.000
Color (%)	22.086	22.347	0.000	100.000
Population Density (LN)	7.938	1.863	0.000	11.662
Below Poverty (%)	10.818	10.765	0.000	67.329
Owner Occupied Units (%)	55.621	25.869	0.000	100.000
Observations	828			

Table C. 122
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Seabrook Station

	rho	p	count
Black (%)	0.1976	0.0000	828
Asian (%)	0.2792	0.0000	828
Hispanic (%)	0.0357	0.3047	828
Color (%)	0.2162	0.0000	828
Population Density (LN)	0.2766	0.0000	828
Below Poverty (%)	0.1506	0.0000	828
Owner Occupied Units (%)	-0.1833	0.0000	828

Table C. 123

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Seabrook Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0068***	0.0074***
			(3.697)	(3.814)
Asian (%)			0.0122***	0.0125***
			(5.478)	(5.432)
Hispanic (%)			-0.0023*	-0.0018
			(-2.095)	(-1.503)
Color (%)	0.0018*	0.0023*		
	(2.086)	(2.181)		
Population Density (LN)	0.0585***	0.0612***	0.0468***	0.0496***
	(5.574)	(5.636)	(4.519)	(4.611)
Below Poverty (%)		-0.0055*		-0.0053*
		(-2.239)		(-2.199)
Owner Occupied Units (%)		-0.0017+		-0.0017+
		(-1.928)		(-1.922)
Constant	2.9017***	3.0240***	2.9478***	3.0671***
	(38.403)	(28.701)	(39.761)	(29.782)
Observations	828	828	828	828
R-squared	0.081	0.088	0.128	0.134
F	36.5256	19.8414	30.2542	21.2329
Log-likelihood	-529.6532	-526.6642	-507.9828	-505.0588
Akaike Info Coefficient	1065.3064	1063.3283	1025.9656	1024.1176
Moran's I-Queen	0.9126***	0.9138***	0.8922***	0.89351***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 124

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Seabrook Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0002	0.0003
			(0.862)	(1.114)
Asian (%)			0.0004	0.0004
			(1.356)	(1.504)
Hispanic (%)			0.0001	0.0002
			(0.800)	(1.090)
Color (%)	0.0002	0.0002+		
	(1.541)	(1.738)		
Population Density (LN)	-0.0017	-0.0014	-0.0019	-0.0016
	(-1.362)	(-1.087)	(-1.490)	(-1.201)
Below Poverty (%)		-0.0003		-0.0003
		(-0.945)		(-0.933)
Owner Occupied Units (%)		-0.0000		-0.0000
		(-0.231)		(-0.222)
Constant	0.0123	0.0130	0.0132	0.0139
	(1.298)	(0.997)	(1.379)	(1.058)
Spatial Autoregressive Coefficient (Rho)	0.9991***	0.9990***	0.9990***	0.9990***
	(1127.633)	(1117.698)	(1092.737)	(1083.537)
Observations	828	828	828	828
R-squared	0.9865	0.9866	0.9866	0.9866
Log-likelihood Queen	1065.4740	1065.9516	1065.8364	1066.3031
Akaike Info Coefficient	-2124.39	-2121.31	-2121.03	-2117.94
Moran's I-Queen	0.1764***	0.1774***	0.1765***	0.1774***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

35. Hope Creek Generating Station, New Jersey and 37. Salem Nuclear Generating Station, New Jersey

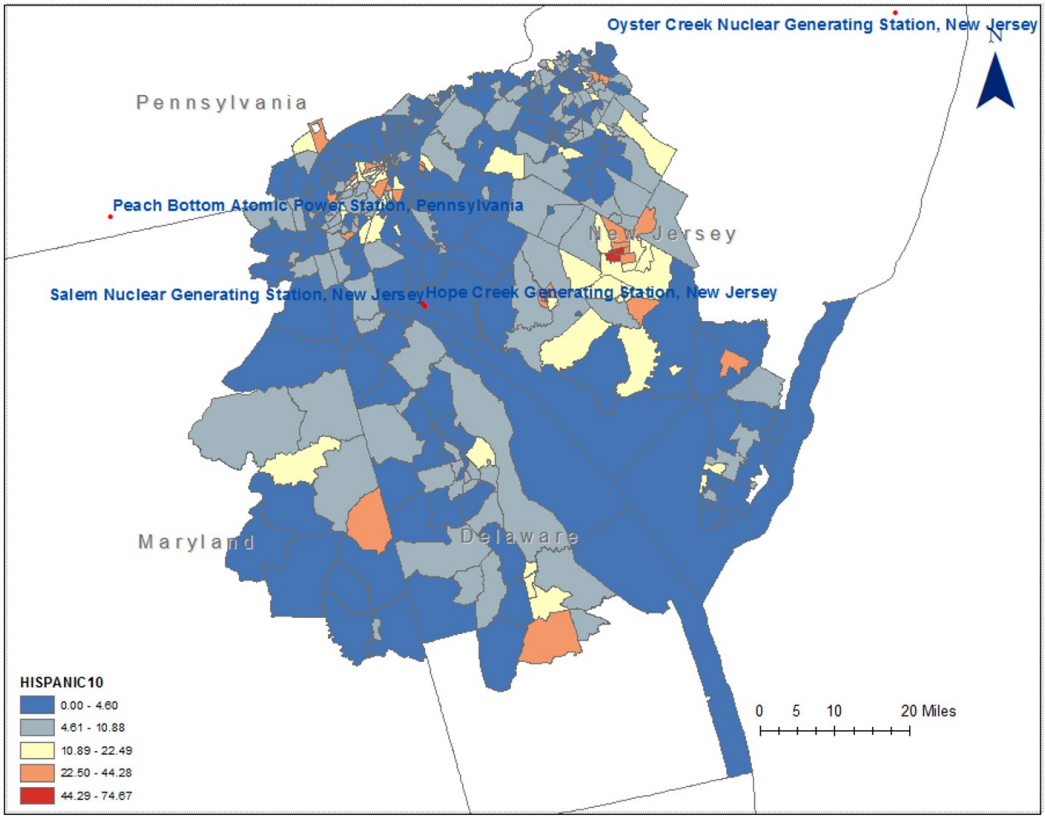

Figure C. 32 Spatial distribution of percent Color among the populations surrounding Hope Creek Generating Station, and Salem Nuclear Generating Station

Table C. 125

Descriptive Statistics for Study Variables at Hope Creek Generating Station, and Salem Nuclear Generating Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.193	0.425	1.401	3.911
Black (%)	18.887	21.386	0.000	97.654
Asian (%)	2.596	3.584	0.000	25.497
Hispanic (%)	7.988	10.135	0.000	74.674
Color (%)	30.955	24.603	0.000	100.000
Population Density (LN)	7.027	1.779	0.000	10.538
Below Poverty (%)	10.901	10.653	0.000	67.557
Owner Occupied Units (%)	64.116	23.278	0.000	99.392
Observations	418			

Table C. 126

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Hope Creek Generating Station, and Salem Nuclear Generating Station

	rho	p	count
Black (%)	-0.1606	0.0010	418
Asian (%)	0.0470	0.3382	418
Hispanic (%)	-0.0645	0.1882	418
Color (%)	-0.1575	0.0012	418
Population Density (LN)	0.0436	0.3736	418
Below Poverty (%)	-0.0794	0.1052	418
Owner Occupied Units (%)	0.0241	0.6228	418

Table C. 127

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Hope Creek Generating Station, and Salem Nuclear Generating Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0042***	-0.0051***
			(-3.901)	(-3.975)
Asian (%)			-0.0025	-0.0029
			(-0.408)	(-0.468)
Hispanic (%)			-0.0030	-0.0038+
			(-1.411)	(-1.712)
Color (%)	-0.0040***	-0.0048***		
	(-4.208)	(-4.042)		
Population Density (LN)	0.0363**	0.0438**	0.0352**	0.0426**
	(2.791)	(3.209)	(2.624)	(3.021)
Below Poverty (%)		-0.0011		-0.0009
		(-0.420)		(-0.328)
Owner Occupied Units (%)		-0.0021+		-0.0021+
		(-1.847)		(-1.897)
Constant	3.0604***	3.1774***	3.0551***	3.1745***
	(36.278)	(30.026)	(36.011)	(29.947)
Observations	418	418	418	418
R-squared	0.043	0.051	0.044	0.053
F	9.2678	5.5466	4.7310	3.8110
Log-likelihood	-225.8689	-224.0650	-225.6377	-223.6855
Akaike Info Coefficient	457.7378	458.1299	461.2754	461.3710
Moran's I-Queen	0.8773***	0.8751***	0.8782***	0.8757***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 128

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Hope Creek Generating Station, and Salem Nuclear Generating Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0002	-0.0005
			(-0.741)	(-1.567)
Asian (%)			-0.0014	-0.0013
			(-0.905)	(-0.824)
Hispanic (%)			0.0001	-0.0002
			(0.237)	(-0.314)
Color (%)	-0.0001	-0.0004		
	(-0.385)	(-1.385)		
Population Density (LN)	0.0034	0.0045	0.0041	0.0051
	(1.052)	(1.331)	(1.241)	(1.454)
Below Poverty (%)		0.0005		0.0004
		(0.744)		(0.623)
Owner Occupied Units (%)		-0.0003		-0.0004
		(-1.233)		(-1.291)
Constant	0.0477	0.0674+	0.0459	0.0669+
	(1.401)	(1.759)	(1.350)	(1.746)
Spatial Autoregressive Coefficient (Rho)	0.9799***	0.9796***	0.9800***	0.9795***
	(112.443)	(111.633)	(112.637)	(111.555)
Observations	418	418	418	418
R-squared	0.9403	0.9407	0.9404	0.9408
Log-likelihood Queen	285.8848	287.6336	286.4309	288.0766
Akaike Info Coefficient	-563.77	-563.27	-560.86	-560.15
Moran's I-Queen	0.1063***	0.1093***	0.1059***	0.1087***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

36. Oyster Creek Nuclear Generating Station, New Jersey

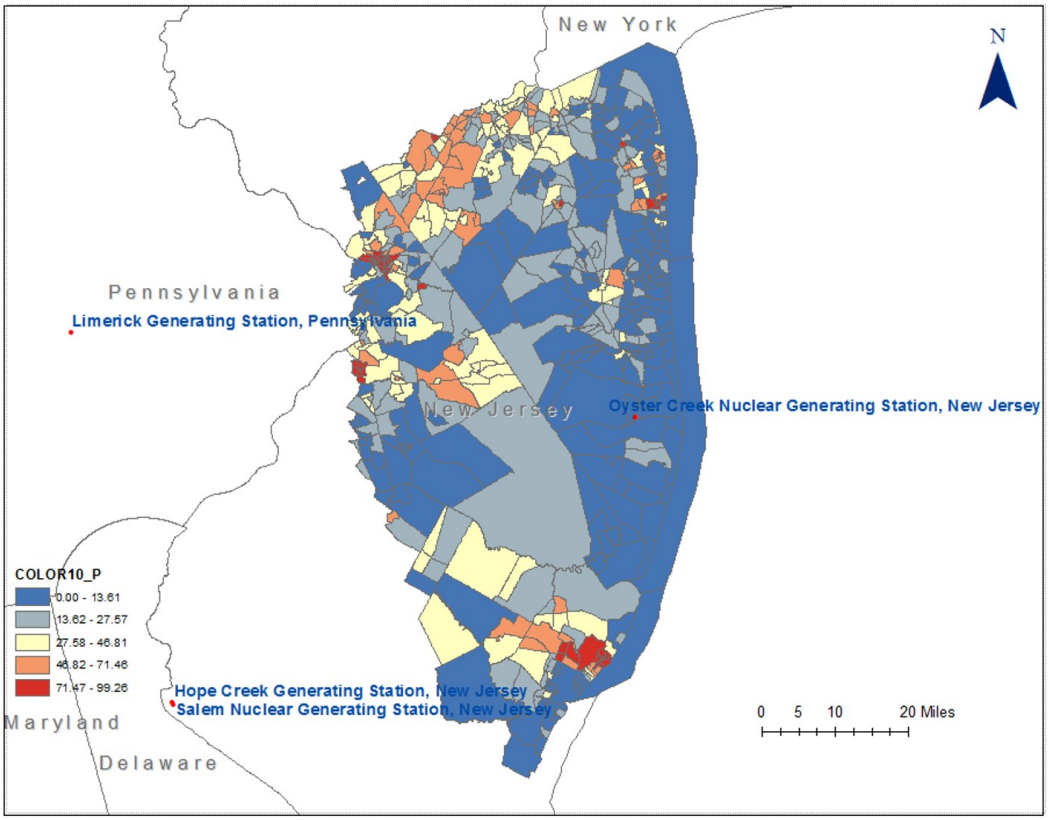

Figure C. 33 Spatial distribution of percent Color among the populations surrounding Oyster Creek Nuclear Generating Station

Table C. 129

Descriptive Statistics for Study Variables at Oyster Creek Nuclear Generating Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.397	0.511	0.510	3.909
Black (%)	11.403	18.443	0.000	91.554
Asian (%)	6.102	8.918	0.000	48.446
Hispanic (%)	9.550	10.520	0.000	67.685
Color (%)	28.164	25.011	0.000	99.264
Population Density (LN)	7.441	1.386	0.000	11.407
Below Poverty (%)	8.099	9.405	0.000	100.000
Owner Occupied Units (%)	66.405	24.920	0.000	100.000
Observations	602			

Table C. 130

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Oyster Creek Nuclear Generating Station

	rho	p	count
Black (%)	0.2022	0.0000	602
Asian (%)	0.3175	0.0000	602
Hispanic (%)	0.1356	0.0008	602
Color (%)	0.3228	0.0000	602
Population Density (LN)	0.2292	0.0000	602
Below Poverty (%)	0.0256	0.5306	602
Owner Occupied Units (%)	-0.0469	0.2505	602

Table C. 131

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Oyster Creek Nuclear Generating Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0046***	0.0059***
			(4.166)	(4.846)
Asian (%)			0.0182***	0.0175***
			(8.457)	(8.130)
Hispanic (%)			0.0016	0.0039+
			(0.802)	(1.805)
Color (%)	0.0056***	0.0077***		
	(6.518)	(7.878)		
Population Density (LN)	0.0427**	0.0520**	0.0524***	0.0566***
	(2.742)	(3.299)	(3.424)	(3.617)
Below Poverty (%)		-0.0109***		-0.0070**
		(-4.227)		(-2.637)
Owner Occupied Units (%)		0.0005		0.0002
		(0.596)		(0.192)
Constant	2.9208***	2.8445***	2.8282***	2.8092***
	(26.580)	(23.450)	(26.201)	(23.548)
Observations	602	602	602	602
R-squared	0.115	0.148	0.171	0.182
F	39.0293	25.8995	30.8743	22.1214
Log-likelihood	-413.0292	-401.7354	-393.3053	-389.2893
Akaike Info Coefficient	832.0585	813.4709	796.6106	792.5786
Moran's I-Queen	0.9066***	0.8728***	0.8674***	0.8553***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 132

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Oyster Creek Nuclear Generating Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0001	0.0000
			(0.777)	(0.145)
Asian (%)			0.0003	0.0003
			(1.111)	(1.090)
Hispanic (%)			-0.0001	-0.0002
			(-0.334)	(-0.894)
Color (%)	0.0001	0.0000		
	(0.863)	(0.266)		
Population Density (LN)	-0.0019	-0.0014	-0.0015	-0.0011
	(-0.982)	(-0.733)	(-0.800)	(-0.535)
Below Poverty (%)		-0.0001		0.0000
		(-0.285)		(0.142)
Owner Occupied Units (%)		-0.0002		-0.0002
		(-1.393)		(-1.570)
Constant	0.0181	0.0275+	0.0163	0.0266+
	(1.269)	(1.754)	(1.131)	(1.690)
Spatial Autoregressive Coefficient (Rho)	0.9982***	0.9982***	0.9980***	0.9981***
	(604.381)	(618.978)	(572.480)	(590.582)
Observations	602	602	602	602
R-squared	0.9868	0.9869	0.9869	0.9869
Log-likelihood Queen	742.6349	743.6265	743.1328	744.5628
Akaike Info Coefficient	-1477.29	-1475.30	-1474.24	-1473.13
Moran's I-Queen	0.1628***	0.1636***	0.1633***	0.1644***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

38. Indian Point Nuclear Generating, New York

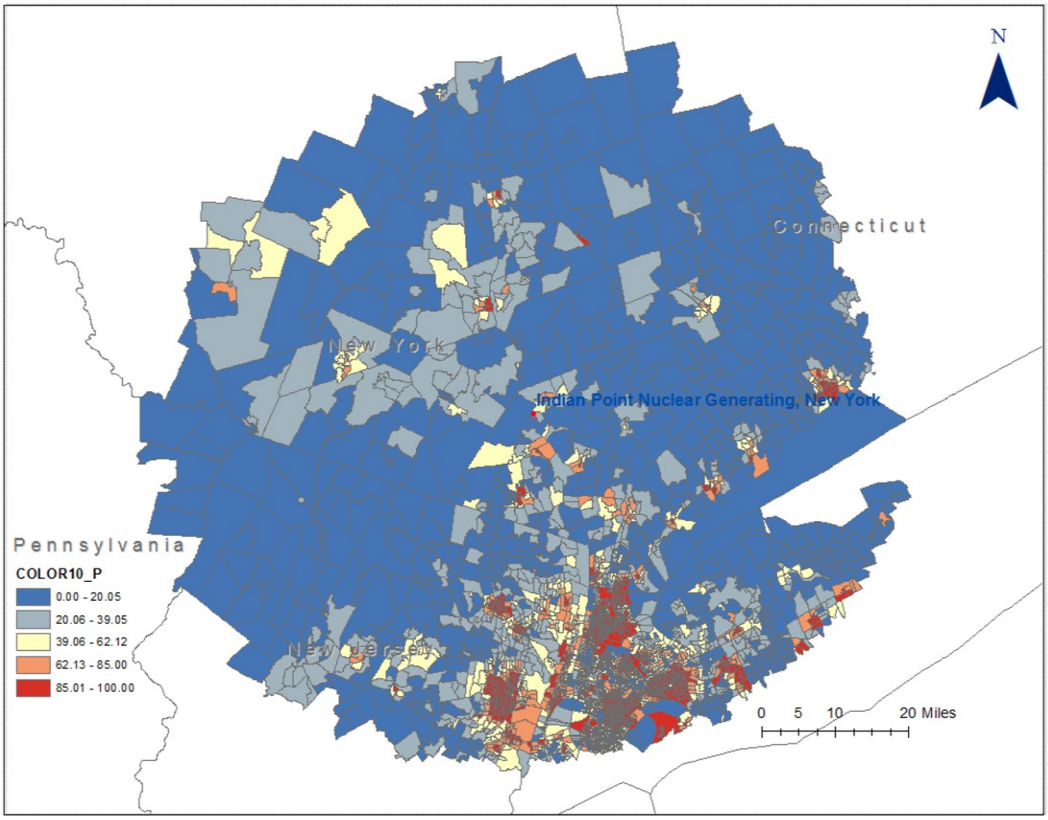

Figure C. 34 Spatial distribution of percent Color among the populations surrounding Indian Point Nuclear Generating

Table C. 133
Descriptive Statistics for Study Variables at Indian Point Nuclear Generating

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.566	0.360	-0.242	3.912
Black (%)	20.639	28.251	0.000	100.000
Asian (%)	9.612	13.163	0.000	100.000
Hispanic (%)	22.554	21.952	0.000	100.000
Color (%)	53.577	33.965	0.000	100.000
Population Density (LN)	9.280	1.943	0.000	12.317
Below Poverty (%)	13.893	13.001	0.000	96.552
Owner Occupied Units (%)	46.476	29.237	0.000	100.000
Observations	4064			

Table C. 134
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Indian Point Nuclear Generating

	rho	p	count
Black (%)	0.1533	0.0000	4064
Asian (%)	0.1263	0.0000	4064
Hispanic (%)	-0.0239	0.1271	4064
Color (%)	0.1657	0.0000	4064
Population Density (LN)	0.2626	0.0000	4064
Below Poverty (%)	0.0814	0.0000	4064
Owner Occupied Units (%)	-0.1437	0.0000	4064

Table C. 135

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Indian Point Nuclear Generating

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0014***	0.0012***
			(6.359)	(5.384)
Asian (%)			0.0027***	0.0024***
			(5.797)	(5.142)
Hispanic (%)			-0.0019***	-0.0023***
			(-6.862)	(-7.347)
Color (%)	0.0003	0.0004+		
	(1.469)	(1.958)		
Population Density (LN)	0.0458***	0.0462***	0.0472***	0.0452***
	(13.535)	(13.403)	(13.910)	(13.114)
Below Poverty (%)		-0.0029***		-0.0017**
		(-4.882)		(-2.915)
Owner Occupied Units (%)		-0.0010***		-0.0015***
		(-3.846)		(-5.838)
Constant	3.1258***	3.2007***	3.1165***	3.2455***
	(113.503)	(89.890)	(114.496)	(92.145)
Observations	4064	4064	4064	4064
R-squared	0.069	0.075	0.099	0.106
F	151.5287	82.8637	111.1564	80.3884
Log-likelihood	-1464.7741	-1451.5189	-1399.8046	-1382.7569
Akaike Info Coefficient	2935.5482	2913.0378	2809.6092	2779.5138
Moran's I-Queen	0.9492***	0.9481***	0.94065***	0.9434***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 136

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Indian Point Nuclear Generating

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0000	-0.0000
			(0.427)	(-0.159)
Asian (%)			0.0000	-0.0000
			(0.106)	(-0.117)
Hispanic (%)			-0.0000	-0.0000
			(-0.401)	(-1.289)
Color (%)	0.0000	-0.0000		
	(0.100)	(-0.614)		
Population Density (LN)	-0.0004	-0.0005+	-0.0004	-0.0005
	(-1.375)	(-1.674)	(-1.288)	(-1.622)
Below Poverty (%)		0.0000		0.0000
		(0.154)		(0.310)
Owner Occupied Units (%)		-0.0000		-0.0000
		(-1.392)		(-1.585)
Constant	0.0073*	0.0102**	0.0073*	0.0107**
	(2.412)	(2.832)	(2.399)	(2.928)
Spatial Autoregressive Coefficient (Rho)	0.9991***	0.9990***	0.9990***	0.9990***
	(1593.198)	(1586.272)	(1559.328)	(1525.039)
Observations	4064	4064	4064	4064
R-squared	0.9936	0.9936	.0.9936	0.9936
Log-likelihood Queen	7947.7636	7949.2008	7947.9705	7949.8891
Akaike Info Coefficient	-15889.7	-15888.6	-15886	-15885.7
Moran's I-Queen	0.0542*	0.1254**	0.3521*	0.1452*

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

39. James A. Fitz Patrick Nuclear Power Plant, New York and 40. Nine Mile Point Nuclear Station, New York

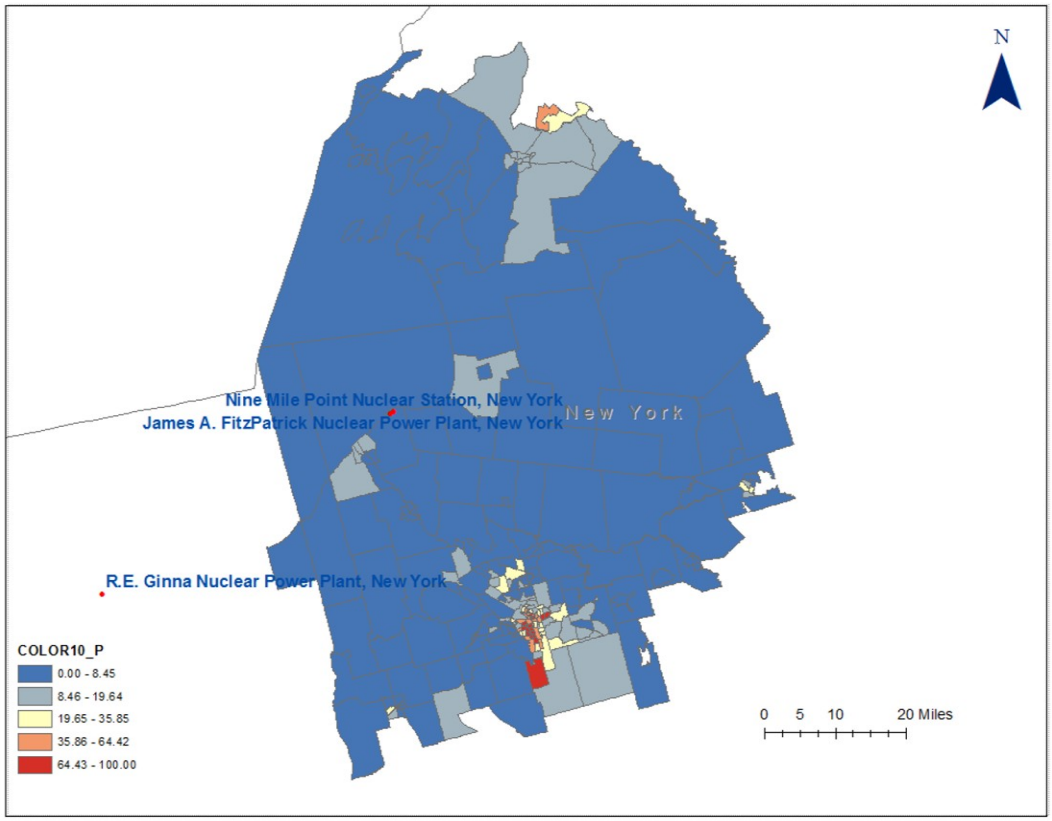

Figure C. 35 Spatial distribution of percent Color among the populations surrounding James A. Fitz Patrick Nuclear Power Plant and Nine Mile Point Nuclear Station

Table C. 137

Descriptive Statistics for Study Variables at James A. Fitz Patrick Nuclear Power Plant and Nine Mile Point Nuclear Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.466	0.443	1.567	3.911
Black (%)	8.844	17.202	0.000	89.832
Asian (%)	2.319	3.692	0.000	22.830
Hispanic (%)	3.608	5.022	0.000	38.780
Color (%)	17.398	22.336	0.000	100.000
Population Density (LN)	6.785	1.969	0.000	9.744
Below Poverty (%)	15.818	15.023	0.000	81.154
Owner Occupied Units (%)	57.566	25.171	0.000	99.894
Observations	231			

Table C. 138

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at James A. Fitz Patrick Nuclear Power Plant and Nine Mile Point Nuclear Station

	rho	p	count
Black (%)	0.1683	0.0104	231
Asian (%)	0.1545	0.0188	231
Hispanic (%)	0.1161	0.0781	231
Color (%)	0.2197	0.0008	231
Population Density (LN)	0.2173	0.0009	231
Below Poverty (%)	0.0309	0.6401	231
Owner Occupied Units (%)	-0.0039	0.9531	231

Table C. 139

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at James A. Fitz Patrick Nuclear Power Plant and Nine Mile Point Nuclear Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0022	0.0052*
			(1.109)	(2.392)
Asian (%)			0.0117	0.0204*
			(1.436)	(2.397)
Hispanic (%)			0.0013	0.0067
			(0.202)	(1.000)
Color (%)	0.0030*	0.0062***		
	(2.099)	(3.542)		
Population Density (LN)	0.0331*	0.0425*	0.0323+	0.0375*
	(2.036)	(2.540)	(1.866)	(2.139)
Below Poverty (%)		-0.0055+		-0.0063*
		(-1.835)		(-2.004)
Owner Occupied Units (%)		0.0018		0.0013
		(1.079)		(0.790)
Constant	3.1892***	3.0542***	3.1957***	3.1181***
	(30.362)	(20.056)	(29.373)	(20.132)
Observations	231	231	231	231
R-squared	0.065	0.104	0.062	0.098
F	7.9598	6.5275	3.7415	4.0743
Log-likelihood	-131.3569	-126.5246	-131.7464	-127.1890
Akaike Info Coefficient	268.7138	263.0492	273.4928	268.3780
Moran's I-Queen	0.8996***	0.8699***	0.8979***	0.8675***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 140

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at James A. Fitz Patrick Nuclear Power Plant and Nine Mile Point Nuclear Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0001	0.0000
			(-0.201)	(0.090)
Asian (%)			0.0001	0.0005
			(0.089)	(0.302)
Hispanic (%)			0.0005	0.0007
			(0.440)	(0.637)
Color (%)	0.0001	0.0002		
	(0.236)	(0.601)		
Population Density (LN)	-0.0018	-0.0016	-0.0018	-0.0018
	(-0.649)	(-0.555)	(-0.598)	(-0.591)
Below Poverty (%)		-0.0001		-0.0001
		(-0.191)		(-0.146)
Owner Occupied Units (%)		0.0001		0.0001
		(0.464)		(0.487)
Constant	0.0348	0.0260	0.0339	0.0253
	(1.477)	(0.846)	(1.416)	(0.818)
Spatial Autoregressive Coefficient (Rho)	0.9946***	0.9943***	0.9946***	0.9944***
	(210.909)	(203.385)	(212.609)	(205.969)
Observations	231	231	231	231
R-squared	0.9716	0.9716	0.9716	0.9716
Log-likelihood Queen	228.3816	228.6317	228.4585	228.6958
Akaike Info Coefficient	-448.76	-445.26	-444.92	-441.39
Moran's I-Queen	0.2065***	0.2043***	0.207***	0.2047***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

41. R.E. Ginna Nuclear Power Plant, New York

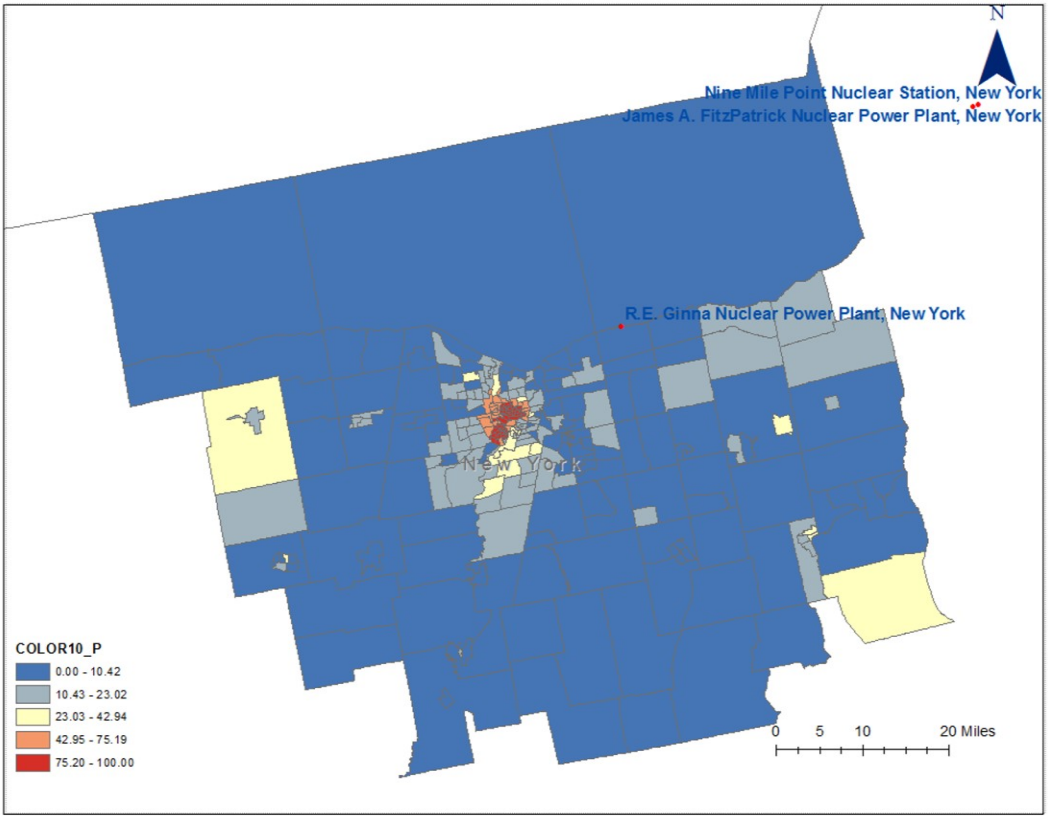

Figure C. 36 Spatial distribution of percent Color among the populations surrounding R.E. Ginna Nuclear Power Plant

Table C. 141
Descriptive Statistics for Study Variables at R.E. Ginna Nuclear Power Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	2.992	0.454	0.882	3.910
Black (%)	14.910	22.638	0.000	93.811
Asian (%)	2.180	3.439	0.000	21.788
Hispanic (%)	6.935	9.955	0.000	56.402
Color (%)	25.413	29.137	0.000	100.000
Population Density (LN)	7.124	1.874	0.000	9.720
Below Poverty (%)	16.291	16.092	0.000	100.000
Owner Occupied Units (%)	59.226	24.824	0.000	100.000
Observations	281			

Table C. 142
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at R.E. Ginna Nuclear Power Plant

	rho	p	count
Black (%)	-0.1868	0.0017	281
Asian (%)	-0.1055	0.0775	281
Hispanic (%)	-0.1784	0.0027	281
Color (%)	-0.2149	0.0003	281
Population Density (LN)	-0.3693	0.0000	281
Below Poverty (%)	-0.0111	0.8527	281
Owner Occupied Units (%)	0.0061	0.9192	281

Table C. 143

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at R.E. Ginna Nuclear Power Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0006	-0.0034*
			(0.394)	(-2.060)
Asian (%)			-0.0040	-0.0087
			(-0.520)	(-1.170)
Hispanic (%)			-0.0015	-0.0068*
			(-0.501)	(-2.151)
Color (%)	0.0002	-0.0041**		
	(0.168)	(-2.901)		
Population Density (LN)	-0.0911***	-0.0950***	-0.0882***	-0.0935***
	(-5.392)	(-5.782)	(-5.182)	(-5.652)
Below Poverty (%)		0.0090***		0.0092***
		(3.505)		(3.571)
Owner Occupied Units (%)		-0.0014		-0.0014
		(-0.939)		(-0.989)
Constant	3.6366***	3.7068***	3.6309***	3.7091***
	(33.346)	(24.801)	(33.157)	(24.790)
Observations	281	281	281	281
R-squared	0.136	0.198	0.138	0.203
F	21.9715	16.9884	11.0764	11.6481
Log-likelihood	-155.6266	-145.3206	-155.3286	-144.3253
Akaike Info Coefficient	317.2533	300.6413	320.6572	302.6507
Moran's I-Queen	0.8560***	0.8292***	0.8558***	0.8239***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 144

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at R.E. Ginna Nuclear Power Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0007*	0.0000
			(2.188)	(0.111)
Asian (%)			0.0012	-0.0001
			(0.658)	(-0.065)
Hispanic (%)			0.0007	-0.0002
			(0.926)	(-0.218)
Color (%)	0.0008**	0.0000		
	(2.959)	(0.052)		
Population Density (LN)	-0.0216***	-0.0207***	-0.0213***	-0.0205***
	(-5.381)	(-5.352)	(-5.305)	(-5.289)
Below Poverty (%)		-0.0004		-0.0004
		(-0.713)		(-0.669)
Owner Occupied Units (%)		-0.0016***		-0.0016***
		(-4.826)		(-4.841)
Constant	0.1841***	0.2999***	0.1831***	0.3006***
	(4.309)	(6.200)	(4.292)	(6.191)
Spatial Autoregressive Coefficient (Rho)	0.9835***	0.9833***	0.9837***	0.9831***
	(100.635)	(100.468)	(100.864)	(99.831)
Observations	281	281	281	281
R-squared	0.9524	0.9565	0.9524	0.9565
Log-likelihood Queen	205.2659	217.9066	205.0412	217.9356
Akaike Info Coefficient	-402.53	-423.81	-398.08	-419.87
Moran's I-Queen	0.0599*	0.0793*	0.0589*	0.0799***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

42. Brunswick Steam Electric Plant, North Carolina

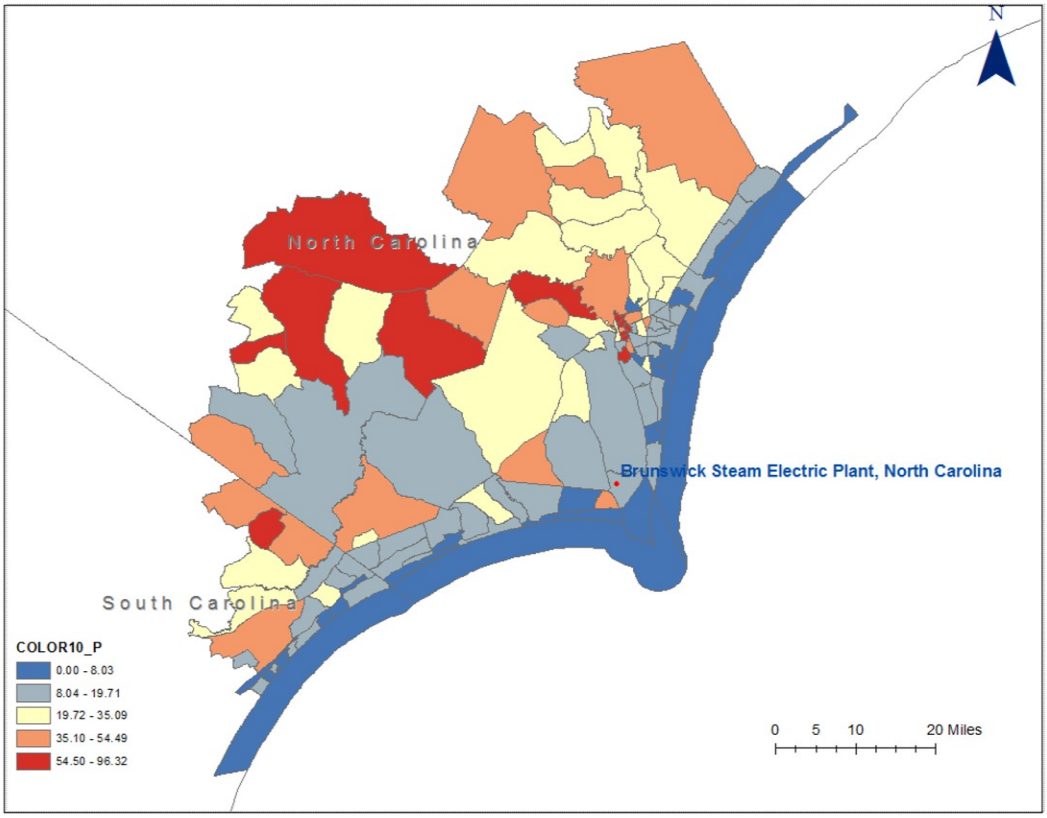

Figure C. 37 Spatial distribution of percent Color among the populations surrounding Brunswick Steam Electric Plant

Table C. 145
Descriptive Statistics for Study Variables at Brunswick Steam Electric Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.152	0.650	0.122	3.912
Black (%)	15.865	18.498	0.000	89.810
Asian (%)	0.708	1.190	0.000	5.607
Hispanic (%)	4.213	4.541	0.000	32.201
Color (%)	22.840	19.974	0.000	96.325
Population Density (LN)	5.683	1.895	0.000	8.611
Below Poverty (%)	14.976	11.697	0.000	52.994
Owner Occupied Units (%)	49.310	22.581	0.000	89.886
Observations	129			

Table C. 146
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Brunswick Steam Electric Plant

	rho	p	count
Black (%)	0.1903	0.0308	129
Asian (%)	-0.0629	0.4788	129
Hispanic (%)	0.0780	0.3793	129
Color (%)	0.1944	0.0272	129
Population Density (LN)	-0.1047	0.2377	129
Below Poverty (%)	0.1065	0.2295	129
Owner Occupied Units (%)	0.0857	0.3341	129

Table C. 147

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Brunswick Steam Electric Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0067*	0.0076
			(2.193)	(1.516)
Asian (%)			-0.0111	-0.0117
			(-0.226)	(-0.234)
Hispanic (%)			0.0133	0.0131
			(1.048)	(1.012)
Color (%)	0.0066*	0.0070		
	(2.335)	(1.551)		
Population Density (LN)	-0.0409	-0.0410	-0.0430	-0.0421
	(-1.373)	(-1.322)	(-1.365)	(-1.295)
Below Poverty (%)		-0.0017		-0.0024
		(-0.222)		(-0.301)
Owner Occupied Units (%)		0.0016		0.0016
		(0.603)		(0.620)
Constant	3.2335***	3.1711***	3.2410***	3.1789***
	(17.421)	(14.821)	(17.542)	(14.725)
Observations	129	129	129	129
R-squared	0.052	0.056	0.058	0.063
F	3.4550	1.8359	1.9143	1.3610
Log-likelihood	-123.4813	-123.2141	-123.0601	-122.7462
Akaike Info Coefficient	252.9627	256.4282	256.1202	259.4924
Moran's I-Queen	0.8163***	0.8164***	0.8155***	0.8152***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 148

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Brunswick Steam Electric Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0012	0.0017
			(1.452)	(1.283)
Asian (%)			0.0020	0.0027
			(0.159)	(0.208)
Hispanic (%)			0.0052	0.0055
			(1.575)	(1.634)
Color (%)	0.0012	0.0015		
	(1.575)	(1.265)		
Population Density (LN)	-0.0133+	-0.0126	-0.0155+	-0.0146+
	(-1.690)	(-1.550)	(-1.892)	(-1.735)
Below Poverty (%)		-0.0007		-0.0010
		(-0.341)		(-0.477)
Owner Occupied Units (%)		-0.0001		-0.0002
		(-0.172)		(-0.249)
Constant	0.0875	0.0922	0.0851	0.0933
	(1.482)	(1.426)	(1.458)	(1.448)
Spatial Autoregressive Coefficient (Rho)	0.9880***	0.9880***	0.9880***	0.9881***
	(94.966)	(95.090)	(95.221)	(95.473)
Observations	129	129	129	129
R-squared	0.9327	0.9328	0.9338	0.9340
Log-likelihood Queen	23.8284	23.8904	24.9107	25.0341
Akaike Info Coefficient	-39.66	-35.78	-37.82	34.07
Moran's I-Queen	0.2021***	0.2004***	0.199***	0.1974***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

43. McGuire Nuclear Station, North Carolina

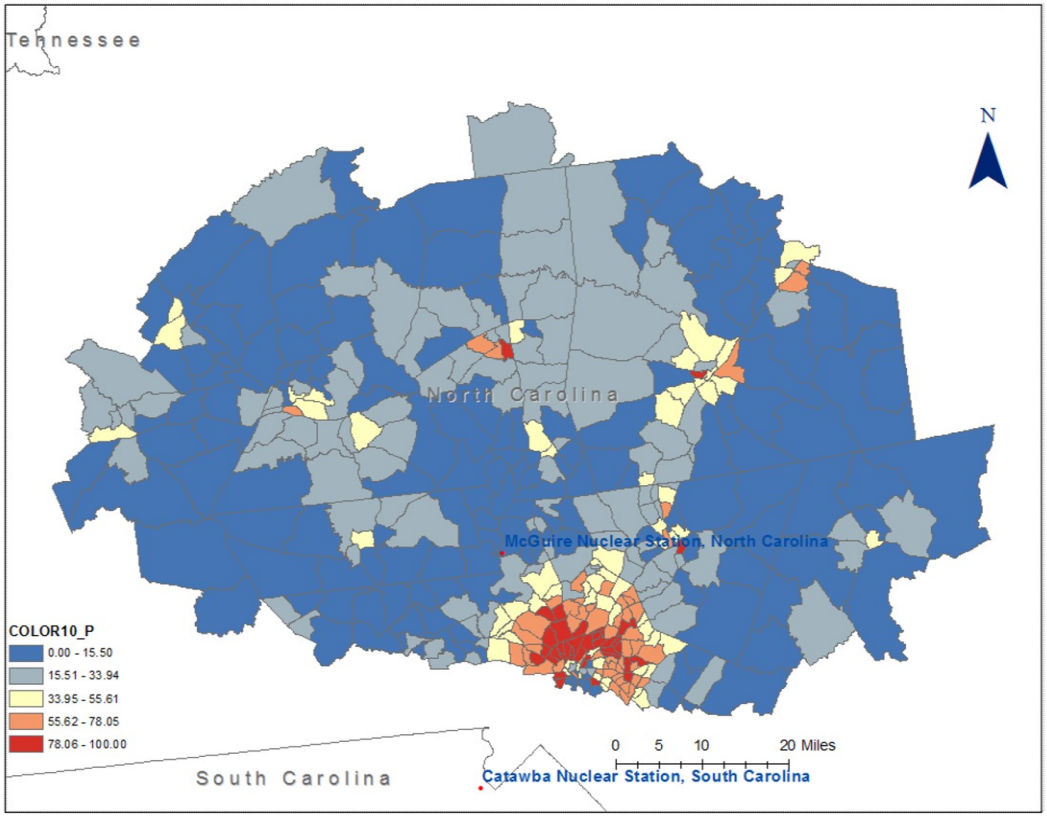

Figure C. 38 Spatial distribution of percent Color among the populations surrounding McGuire Nuclear Station

Table C. 149

Descriptive Statistics for Study Variables at McGuire Nuclear Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	2.966	0.590	0.712	3.903
Black (%)	20.870	23.303	0.000	100.000
Asian (%)	2.447	3.549	0.000	27.677
Hispanic (%)	8.051	8.594	0.000	62.023
Color (%)	32.857	27.845	0.000	100.000
Population Density (LN)	6.562	1.245	0.000	9.183
Below Poverty (%)	14.758	10.496	0.000	68.618
Owner Occupied Units (%)	61.054	19.152	0.000	100.000
Observations	420			

Table C. 150

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at McGuire Nuclear Station

	rho	p	count
Black (%)	-0.1963	0.0001	420
Asian (%)	-0.1421	0.0035	420
Hispanic (%)	-0.0113	0.8181	420
Color (%)	-0.1859	0.0001	420
Population Density (LN)	-0.3581	0.0000	420
Below Poverty (%)	0.1797	0.0002	420
Owner Occupied Units (%)	-0.0274	0.5753	420

Table C. 151

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at McGuire Nuclear Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0006	-0.0040**
			(0.398)	(-2.596)
Asian (%)			-0.0100	-0.0062
			(-1.292)	(-0.825)
Hispanic (%)			0.0131***	0.0067+
			(3.794)	(1.905)
Color (%)	0.0021	-0.0026+		
	(1.621)	(-1.826)		
Population Density (LN)	-0.2016***	-0.1796***	-0.2096***	-0.1883***
	(-6.910)	(-6.219)	(-7.226)	(-6.556)
Below Poverty (%)		0.0168***		0.0165***
		(4.807)		(4.644)
Owner Occupied Units (%)		-0.0019		-0.0017
		(-0.990)		(-0.844)
Constant	4.2196***	4.1016***	4.2485***	4.1047***
	(25.128)	(15.914)	(25.515)	(16.024)
Observations	420	420	420	420
R-squared	0.134	0.214	0.160	0.232
F	32.1851	28.3076	19.8121	20.7404
Log-likelihood	-343.8345	-323.3168	-337.2807	-318.6716
Akaike Info Coefficient	693.6691	656.6336	684.5613	651.3432
Moran's I-Queen	0.9057***	0.8471***	0.8852***	0.8293***

Table C. 152

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at McGuire Nuclear Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0001	0.0000
			(0.922)	(0.253)
Asian (%)			-0.0001	0.0001
			(-0.066)	(0.092)
Hispanic (%)			0.0006	0.0004
			(1.406)	(1.033)
Color (%)	0.0002	0.0001		
	(1.348)	(0.541)		
Population Density (LN)	-0.0079*	-0.0070*	-0.0082*	-0.0074*
	(-2.388)	(-2.048)	(-2.484)	(-2.162)
Below Poverty (%)		0.0005		0.0005
		(1.313)		(1.268)
Owner Occupied Units (%)		0.0001		0.0001
		(0.332)		(0.401)
Constant	0.0561**	0.0419	0.0579**	0.0424
	(2.722)	(1.329)	(2.781)	(1.339)
Spatial Autoregressive Coefficient (Rho)	0.9978***	0.9975***	0.9976***	0.9974***
	(497.350)	(448.055)	(476.574)	(434.568)
Observations	420	420	420	420
R-squared	0.9890	0.9891	0.9891	0.9891
Log-likelihood Queen	496.5539	497.5265	497.0656	497.9308
Akaike Info Coefficient	-985.11	-983.05	-982.13	-979.86
Moran's I-Queen	0.2128***	0.2075***	0.213***	0.2078***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

44. Shearon Harris Nuclear Power Plant, North Carolina

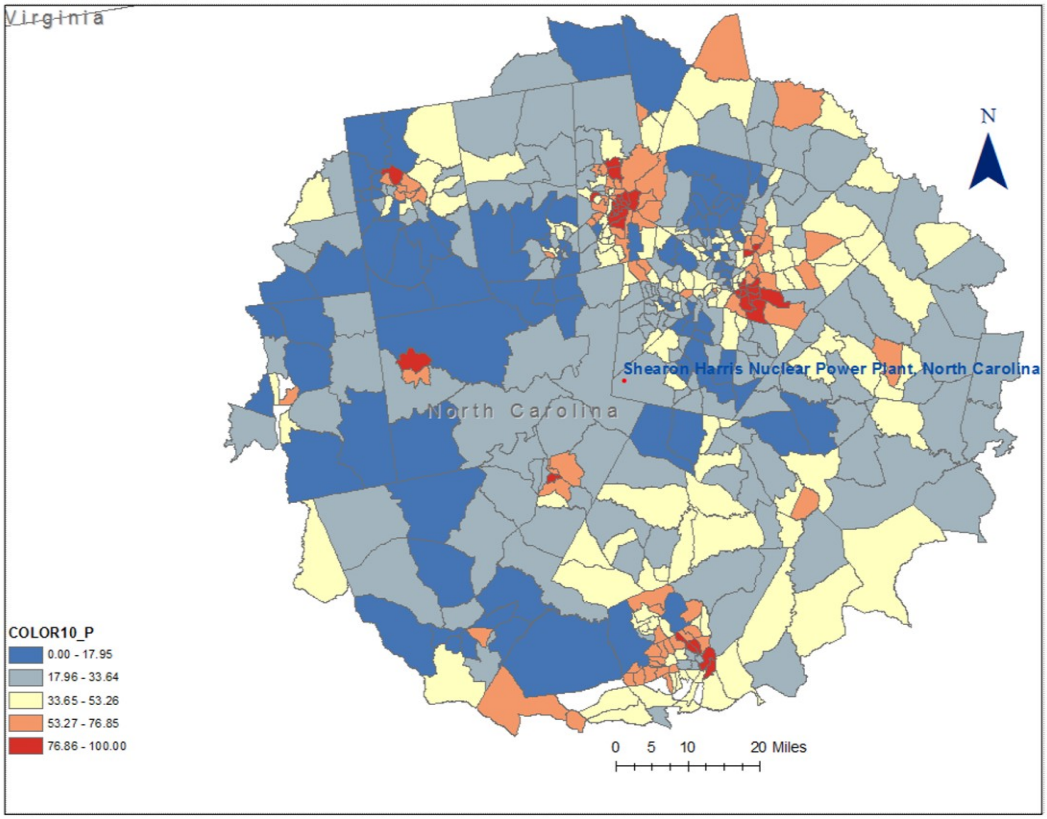

Figure C. 39 Spatial distribution of percent Color among the populations surrounding Shearon Harris Nuclear Power Plant

Table C. 153
Descriptive Statistics for Study Variables at Shearon Harris Nuclear Power Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.250	0.463	1.249	3.912
Black (%)	22.147	19.122	0.000	94.517
Asian (%)	3.383	5.284	0.000	38.968
Hispanic (%)	9.394	8.720	0.000	58.769
Color (%)	37.202	22.616	0.000	100.000
Population Density (LN)	6.601	1.484	0.000	9.560
Below Poverty (%)	14.322	12.563	0.000	96.276
Owner Occupied Units (%)	57.723	23.234	0.000	100.000
Observations	519			

Table C. 154
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Shearon Harris Nuclear Power Plant

	rho	p	count
Black (%)	0.1806	0.0000	519
Asian (%)	-0.3204	0.0000	519
Hispanic (%)	0.0792	0.0714	519
Color (%)	0.1171	0.0076	519
Population Density (LN)	-0.2176	0.0000	519
Below Poverty (%)	0.1768	0.0001	519
Owner Occupied Units (%)	-0.1044	0.0174	519

Table C. 155

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Shearon Harris Nuclear Power Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0046***	0.0031**
			(4.227)	(2.603)
Asian (%)			-0.0181***	-0.0182***
			(-4.450)	(-4.449)
Hispanic (%)			0.0020	0.0003
			(0.885)	(0.141)
Color (%)	0.0049***	0.0029**		
	(5.267)	(2.763)		
Population Density (LN)	-0.0973***	-0.1020***	-0.0643***	-0.0721***
	(-6.852)	(-7.171)	(-4.326)	(-4.827)
Below Poverty (%)		0.0055**		0.0033+
		(2.817)		(1.667)
Owner Occupied Units (%)		-0.0011		-0.0018+
		(-1.110)		(-1.766)
Constant	3.7100***	3.8022***	3.6144***	3.7729***
	(41.995)	(29.709)	(40.905)	(30.077)
Observations	519	519	519	519
R-squared	0.096	0.120	0.149	0.166
F	27.3873	17.5678	22.4458	16.9309
Log-likelihood	-310.0822	-303.0097	-294.4851	-289.2942
Akaike Info Coefficient	626.1643	616.0194	598.9701	592.5885
Moran's I-Queen	0.9099***	0.8942***	0.8788***	0.8635***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 156

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Shearon Harris Nuclear Power Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0000	-0.0001
			(0.226)	(-0.332)
Asian (%)			0.0004	0.0006
			(0.701)	(0.928)
Hispanic (%)			0.0005	0.0004
			(1.491)	(1.213)
Color (%)	0.0001	0.0000		
	(0.945)	(0.239)		
Population Density (LN)	-0.0019	-0.0019	-0.0023	-0.0026
	(-0.907)	(-0.889)	(-1.006)	(-1.122)
Below Poverty (%)		0.0005+		0.0005+
		(1.655)		(1.822)
Owner Occupied Units (%)		0.0001		0.0001
		(0.580)		(0.715)
Constant	0.0280	0.0204	0.0269	0.0176
	(1.510)	(0.859)	(1.475)	(0.757)
Spatial Autoregressive Coefficient (Rho)	0.9951***	0.9948***	0.9955***	0.9953***
	(280.619)	(268.877)	(291.920)	(285.418)
Observations	519	519	519	519
R-squared	0.9800	0.9801	0.9801	0.9803
Log-likelihood Queen	588.6749	590.0479	589.4966	591.1551
Akaike Info Coefficient	-1169.57	-1168.29	-1167.24	-1166.54
Moran's I-Queen	0.0872***	0.0852***	0.0875***	0.0849***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

45. Davis-Besse Nuclear Power Station, Ohio

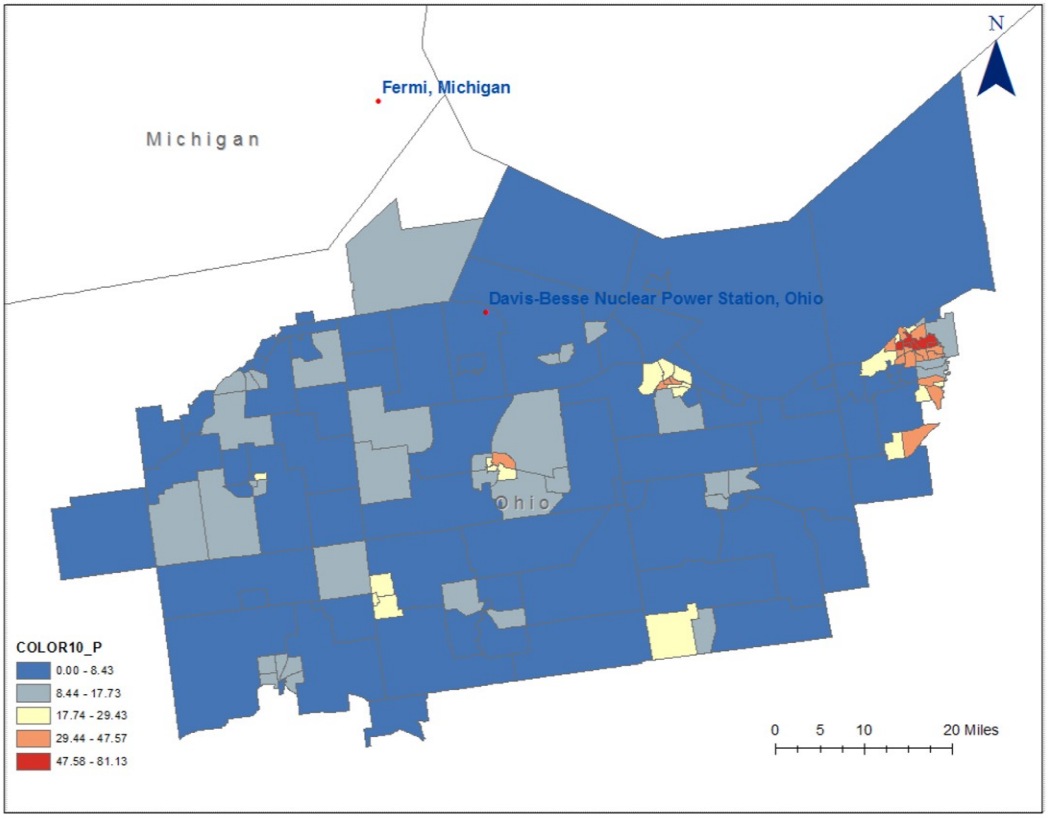

Figure C. 40 Spatial distribution of percent Color among the populations surrounding Davis-Besse Nuclear Power Station

Table C. 157
Descriptive Statistics for Study Variables at Davis-Besse Nuclear Power Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.417	0.487	1.458	3.911
Black (%)	5.655	8.976	0.000	42.312
Asian (%)	0.790	1.180	0.000	7.430
Hispanic (%)	7.161	8.991	0.000	59.476
Color (%)	15.287	15.906	0.000	81.132
Population Density (LN)	6.138	1.772	0.000	9.054
Below Poverty (%)	14.372	12.414	0.000	83.770
Owner Occupied Units (%)	62.282	18.785	0.000	92.361
Observations	156			

Table C. 158
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Davis-Besse Nuclear Power Station

	rho	p	count
Black (%)	0.1887	0.0183	156
Asian (%)	0.0962	0.2321	156
Hispanic (%)	0.2196	0.0059	156
Color (%)	0.2512	0.0016	156
Population Density (LN)	0.2189	0.0060	156
Below Poverty (%)	0.1925	0.0160	156
Owner Occupied Units (%)	0.0103	0.8988	156

Table C. 159

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Davis-Besse Nuclear Power Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0042	0.0043
			(0.797)	(0.743)
Asian (%)			0.0439	0.0442
			(1.295)	(1.306)
Hispanic (%)			0.0085+	0.0073
			(1.724)	(1.423)
Color (%)	0.0057*	0.0053		
	(1.997)	(1.556)		
Population Density (LN)	0.0314	0.0273	0.0275	0.0225
	(1.219)	(1.048)	(1.037)	(0.841)
Below Poverty (%)		0.0054		0.0055
		(1.149)		(1.167)
Owner Occupied Units (%)		0.0046+		0.0046+
		(1.862)		(1.816)
Constant	3.1365***	2.8024***	3.1290***	2.8040***
	(21.832)	(12.237)	(21.430)	(12.208)
Observations	156	156	156	156
R-squared	0.072	0.093	0.081	0.102
F	5.9450	3.8874	3.3367	2.8131
Log-likelihood	-102.7056	-100.8981	-101.9365	-100.1729
Akaike Info Coefficient	211.4111	211.7961	213.8730	214.3457
Moran's I-Queen	0.9177***	0.8977***	0.9071***	0.8882***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 160

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Davis-Besse Nuclear Power Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0001	0.0004
			(-0.048)	(0.291)
Asian (%)			-0.0051	-0.0046
			(-0.635)	(-0.569)
Hispanic (%)			-0.0003	-0.0001
			(-0.217)	(-0.097)
Color (%)	-0.0000	0.0002		
	(-0.065)	(0.288)		
Population Density (LN)	0.0015	0.0019	0.0024	0.0027
	(0.240)	(0.303)	(0.384)	(0.426)
Below Poverty (%)		-0.0002		-0.0002
		(-0.153)		(-0.152)
Owner Occupied Units (%)		0.0005		0.0005
		(0.788)		(0.796)
Constant	0.1624**	0.1324+	0.1580*	0.1283+
	(2.625)	(1.838)	(2.552)	(1.784)
Spatial Autoregressive Coefficient (Rho)	0.9529***	0.9518***	0.9541***	0.9531***
	(57.696)	(56.993)	(57.907)	(57.224)
Observations	156	156	156	156
R-squared	0.9463	0.9466	0.9465	0.9468
Log-likelihood Queen	95.0078	95.5149	95.2152	95.7231
Akaike Info Coefficient	-182.02	-179.03	-178.43	-175.45
Moran's I-Queen	0.1453***	0.1459***	0.1436***	0.1415***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

46. Perry Nuclear Power Plant, Ohio

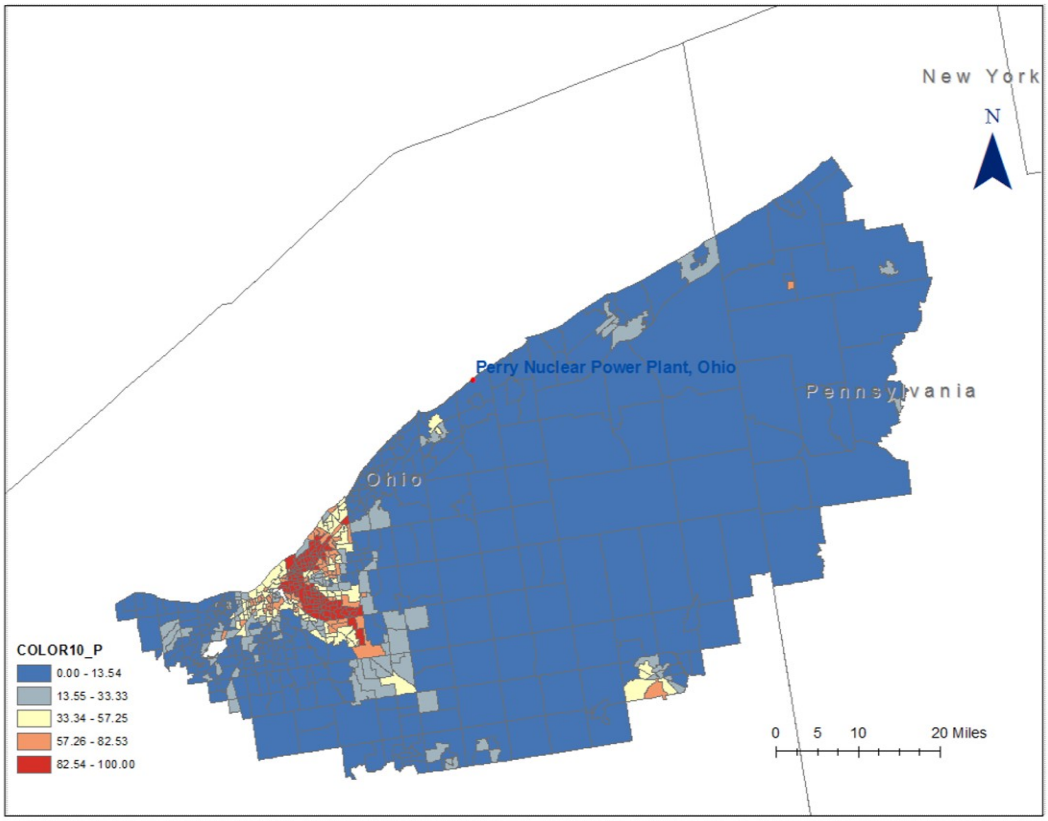

Figure C. 41 Spatial distribution of percent Color among the populations surrounding Perry Nuclear Power Plant

Table C. 161
Descriptive Statistics for Study Variables at Perry Nuclear Power Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.456	0.447	0.166	3.912
Black (%)	25.989	34.370	0.000	100.000
Asian (%)	1.800	3.276	0.000	34.135
Hispanic (%)	3.920	7.331	0.000	52.830
Color (%)	33.143	34.145	0.000	100.000
Population Density (LN)	7.709	1.347	3.834	9.717
Below Poverty (%)	16.970	15.036	0.000	81.155
Owner Occupied Units (%)	58.448	24.750	0.000	100.000
Observations	661			

Table C. 162
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Perry Nuclear Power Plant

	rho	p	count
Black (%)	0.0026	0.9473	661
Asian (%)	0.0973	0.0123	661
Hispanic (%)	0.0453	0.2452	661
Color (%)	0.0216	0.5802	661
Population Density (LN)	0.1531	0.0001	661
Below Poverty (%)	0.0473	0.2241	661
Owner Occupied Units (%)	-0.0559	0.1513	661

Table C. 163

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Perry Nuclear Power Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0009	-0.0013+
			(-1.459)	(-1.684)
Asian (%)			0.0096+	0.0100+
			(1.769)	(1.808)
Hispanic (%)			-0.0005	-0.0017
			(-0.194)	(-0.624)
Color (%)	-0.0010+	-0.0014+		
	(-1.720)	(-1.891)		
Population Density (LN)	0.0638***	0.0626***	0.0589***	0.0593***
	(4.302)	(4.132)	(3.862)	(3.836)
Below Poverty (%)		0.0012		0.0020
		(0.617)		(0.997)
Owner Occupied Units (%)		-0.0002		0.0003
		(-0.148)		(0.263)
Constant	2.9972***	3.0103***	3.0088***	2.9681***
	(27.986)	(19.059)	(27.805)	(18.609)
Observations	661	661	661	661
R-squared	0.028	0.029	0.033	0.035
F	9.4104	4.8968	5.6825	3.9773
Log-likelihood	-395.2057	-394.8025	-393.2686	-392.6815
Akaike Info Coefficient	796.4114	799.6050	796.5373	799.3630
Moran's I-Queen	0.9538***	0.9526***	0.9504***	0.9481***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 164

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Perry Nuclear Power Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0000	-0.0001
			(-0.287)	(-0.550)
Asian (%)			0.0002	0.0003
			(0.322)	(0.373)
Hispanic (%)			-0.0001	-0.0002
			(-0.365)	(-0.598)
Color (%)	-0.0000	-0.0000		
	(-0.317)	(-0.489)		
Population Density (LN)	0.0002	0.0002	0.0003	0.0003
	(0.123)	(0.116)	(0.140)	(0.160)
Below Poverty (%)		0.0001		0.0002
		(0.445)		(0.628)
Owner Occupied Units (%)		0.0000		0.0000
		(0.120)		(0.193)
Constant	0.0201	0.0181	0.0198	0.0162
	(1.171)	(0.785)	(1.140)	(0.696)
Spatial Autoregressive Coefficient (Rho)	0.9942***	0.9942***	0.9942***	0.9941***
	(305.620)	(304.950)	(304.143)	(302.975)
Observations	661	661	661	661
R-squared	0.9830	0.9830	0.9830	0.9830
Log-likelihood Queen	823.0877	823.2033	823.2000	823.4222
Akaike Info Coefficient	-1638.28	-1634.51	-1634.50	-1630.95
Moran's I-Queen	0.0442***	0.0441*	0.0442***	0.0441***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

47. Beaver Valley Power Station, Pennsylvania

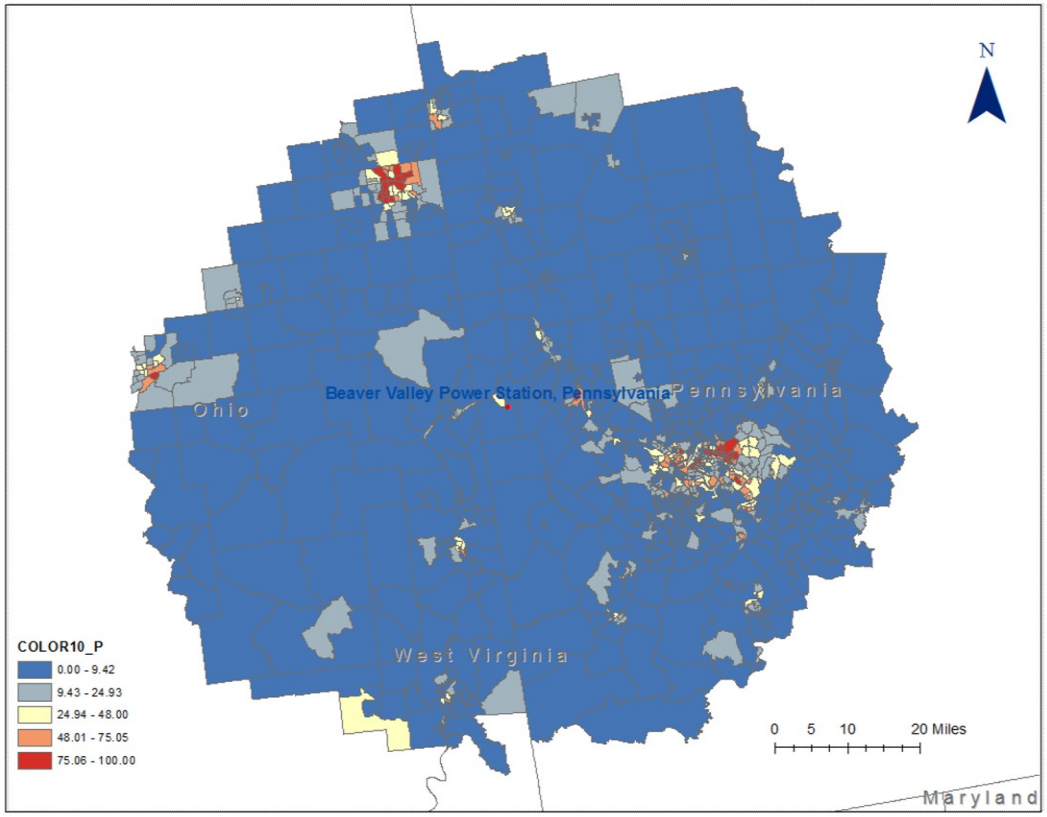

Figure C. 42 Spatial distribution of percent Color among the populations surrounding Beaver Valley Power Station

Table C. 165
Descriptive Statistics for Study Variables at Beaver Valley Power Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.349	0.444	0.407	3.912
Black (%)	11.546	20.549	0.000	98.381
Asian (%)	1.309	3.105	0.000	43.551
Hispanic (%)	1.593	2.666	0.000	33.835
Color (%)	16.182	22.214	0.000	100.000
Population Density (LN)	7.190	1.576	0.000	10.167
Below Poverty (%)	14.961	12.805	0.000	90.736
Owner Occupied Units (%)	61.680	21.086	0.000	100.000
Observations	935			

Table C. 166
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Beaver Valley Power Station

	rho	p	count
Black (%)	0.0408	0.2125	935
Asian (%)	-0.0437	0.1814	935
Hispanic (%)	0.0384	0.2402	935
Color (%)	0.0347	0.2897	935
Population Density (LN)	-0.0176	0.5905	935
Below Poverty (%)	0.0838	0.0103	935
Owner Occupied Units (%)	-0.0260	0.4280	935

Table C. 167

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Beaver Valley Power Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0009	-0.0001
			(1.154)	(-0.074)
Asian (%)			-0.0055	-0.0047
			(-1.138)	(-0.963)
Hispanic (%)			0.0057	0.0036
			(1.011)	(0.621)
Color (%)	0.0010	-0.0001		
	(1.402)	(-0.144)		
Population Density (LN)	-0.0108	-0.0121	-0.0080	-0.0106
	(-1.065)	(-1.185)	(-0.788)	(-1.020)
Below Poverty (%)		0.0047**		0.0042*
		(2.745)		(2.471)
Owner Occupied Units (%)		0.0010		0.0009
		(1.018)		(0.905)
Constant	3.4102***	3.3065***	3.3946***	3.3077***
	(48.539)	(29.537)	(47.911)	(29.515)
Observations	935	935	935	935
R-squared	0.002	0.011	0.005	0.012
F	1.1283	2.4988	1.2173	1.8715
Log-likelihood	-566.7758	-562.9088	-565.4650	-562.2834
Akaike Info Coefficient	1139.5516	1135.8175	1140.9301	1138.5667
Moran's I-Queen	0.9556***	0.9477***	0.9543***	0.9478***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 168

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Beaver Valley Power Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0000	-0.0000
			(-0.299)	(-0.307)
Asian (%)			-0.0003	-0.0004
			(-0.572)	(-0.689)
Hispanic (%)			-0.0004	-0.0004
			(-0.624)	(-0.592)
Color (%)	-0.0001	-0.0001		
	(-0.701)	(-0.697)		
Population Density (LN)	-0.0003	-0.0004	-0.0002	-0.0003
	(-0.229)	(-0.332)	(-0.194)	(-0.264)
Below Poverty (%)		-0.0001		-0.0001
		(-0.393)		(-0.534)
Owner Occupied Units (%)		-0.0001		-0.0001
		(-0.749)		(-0.771)
Constant	0.0080	0.0156	0.0082	0.0160
	(0.899)	(1.156)	(0.913)	(1.187)
Spatial Autoregressive Coefficient (Rho)	0.9988***	0.9988***	0.9988***	0.9988***
	(926.732)	(933.090)	(924.954)	(933.090)
Observations	935	935	935	935
R-squared	0.9867	0.9867	0.9867	0.9867
Log-likelihood Queen	1282.0184	1282.2989	1282.2252	1282.5329
Akaike Info Coefficient	-2557.09	-2553.67	-2553.50	-2550.14
Moran's I-Queen	0.2197***	0.2193***	0.2194***	0.2191***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

48. Limerick Generating Station, Pennsylvania

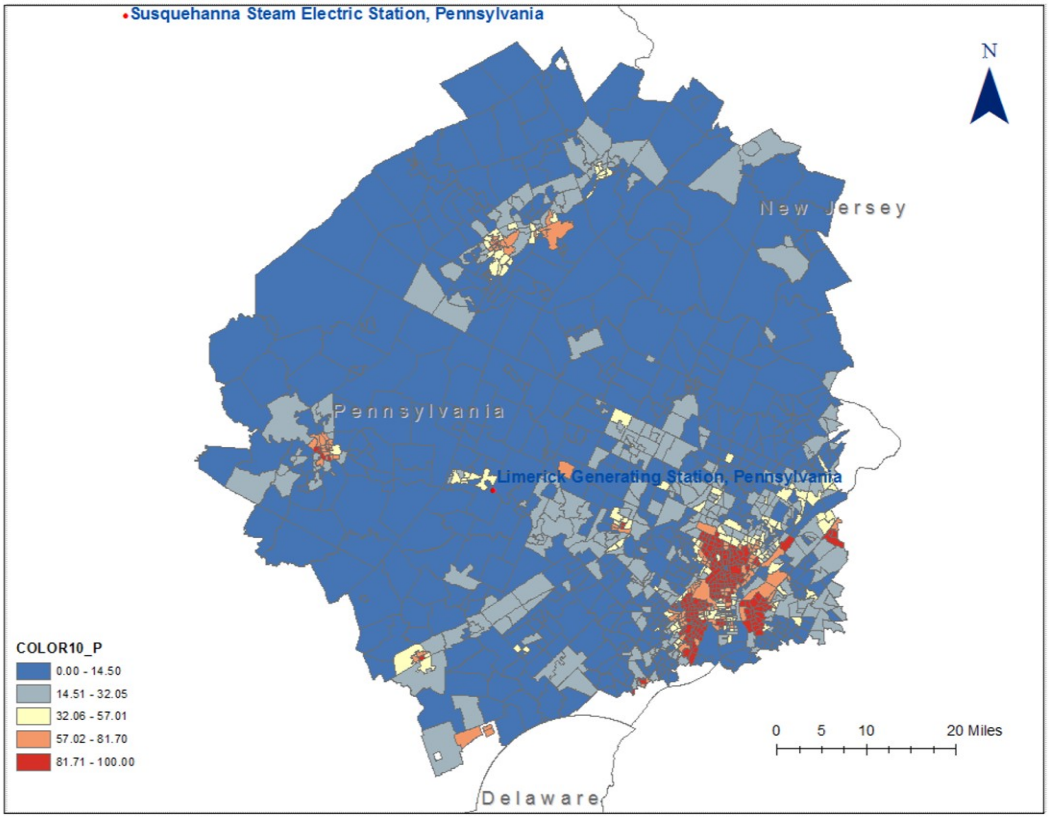

Figure C. 43 Spatial distribution of percent Color among the populations surrounding Limerick Generating Station

Table C. 169
Descriptive Statistics for Study Variables at Limerick Generating Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.174	0.443	0.421	3.905
Black (%)	19.048	28.276	0.000	100.000
Asian (%)	4.488	6.234	0.000	79.156
Hispanic (%)	8.677	14.777	0.000	89.623
Color (%)	33.330	32.139	0.000	100.000
Population Density (LN)	8.216	1.523	0.000	11.047
Below Poverty (%)	13.354	14.505	0.000	91.155
Owner Occupied Units (%)	62.766	23.363	0.000	100.000
Observations	1314			

Table C. 170
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Limerick Generating Station

	rho	p	count
Black (%)	0.1144	0.0000	1314
Asian (%)	0.0287	0.2983	1314
Hispanic (%)	0.1036	0.0002	1314
Color (%)	0.1508	0.0000	1314
Population Density (LN)	0.1518	0.0000	1314
Below Poverty (%)	0.1399	0.0000	1314
Owner Occupied Units (%)	-0.1057	0.0001	1314

Table C. 171

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Limerick Generating Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0011*	0.0008
			(2.112)	(1.360)
Asian (%)			0.0016	0.0015
			(0.812)	(0.718)
Hispanic (%)			0.0022*	0.0018
			(2.527)	(1.639)
Color (%)	0.0013**	0.0009		
	(2.743)	(1.416)		
Population Density (LN)	0.0279**	0.0263**	0.0270**	0.0259*
	(2.814)	(2.617)	(2.710)	(2.564)
Below Poverty (%)		0.0014		0.0010
		(1.016)		(0.646)
Owner Occupied Units (%)		0.0000		0.0000
		(0.069)		(0.070)
Constant	2.9017***	2.9062***	2.9053***	2.9066***
	(39.184)	(29.863)	(39.219)	(29.808)
Observations	1314	1314	1314	1314
R-squared	0.029	0.029	0.030	0.030
F	19.3056	9.9422	10.1538	6.8383
Log-likelihood	-776.0675	-775.4747	-775.0626	-774.8301
Akaike Info Coefficient	1558.1351	1560.9494	1560.1252	1563.6603
Moran's I-Queen	0.9668***	0.9669***	0.9664***	0.9666***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 172

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Limerick Generating Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0000	0.0001
			(0.967)	(1.183)
Asian (%)			0.0000	0.0000
			(0.177)	(0.289)
Hispanic (%)			0.0001	0.0001
			(0.897)	(1.117)
Color (%)	0.0000	0.0001		
	(1.161)	(1.221)		
Population Density (LN)	-0.0018*	-0.0017*	-0.0018*	-0.0017*
	(-2.176)	(-2.047)	(-2.170)	(-2.014)
Below Poverty (%)		-0.0000		-0.0001
		(-0.329)		(-0.500)
Owner Occupied Units (%)		0.0000		0.0000
		(0.257)		(0.224)
Constant	0.0174**	0.0157+	0.0175**	0.0158+
	(2.721)	(1.905)	(2.732)	(1.916)
Spatial Autoregressive Coefficient (Rho)	0.9990***	0.9991***	0.9990***	0.9990***
	(1601.746)	(1605.840)	(1598.210)	(1602.224)
Observations	1314	1314	1314	1314
R-squared	0.9933	0.9933	0.9933	0.9933
Log-likelihood Queen	2259.7418	2259.8891	2259.8358	2260.0721
Akaike Info Coefficient	-4511.00	-4507.00	-4507.00	-4504.00
Moran's I-Queen	0.1769***	0.1772***	0.1774***	0.177***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

49. Peach Bottom Atomic Power Station, Pennsylvania

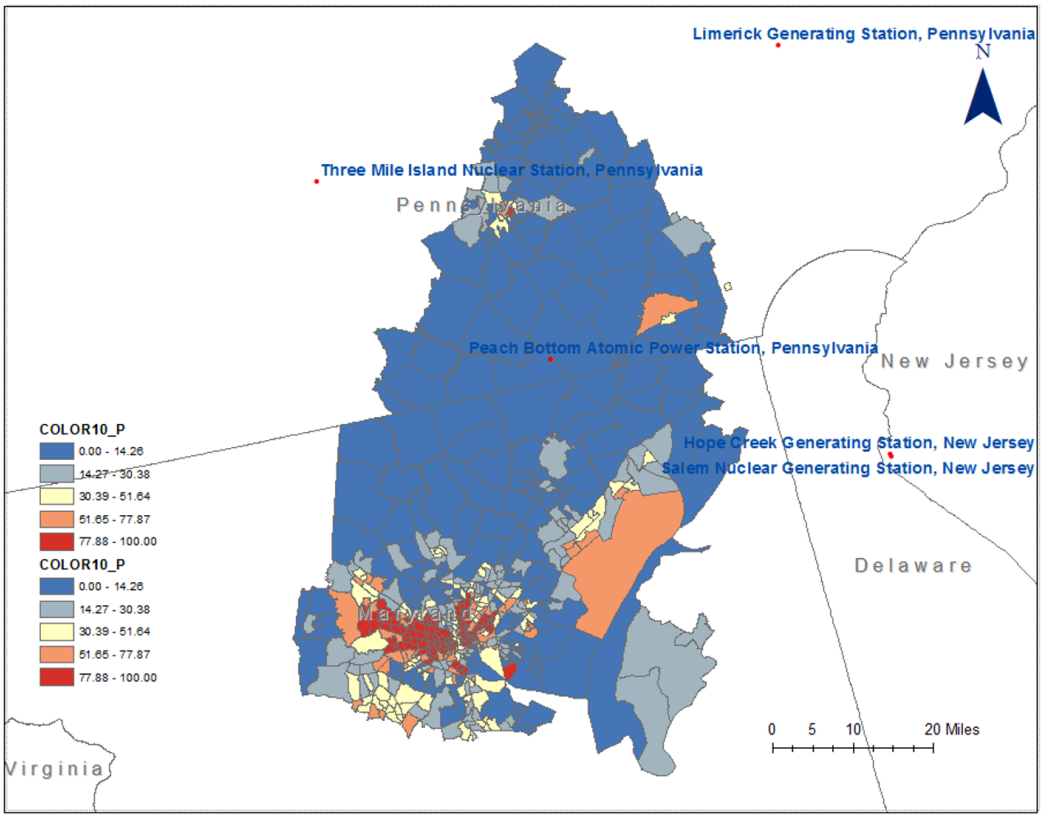

Figure C. 44 Spatial distribution of percent Color among the populations surrounding Peach Bottom Atomic Power Station

Table C. 173
Descriptive Statistics for Study Variables at Peach Bottom Atomic Power Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.439	0.379	1.083	3.905
Black (%)	30.234	34.430	0.000	100.000
Asian (%)	3.488	4.836	0.000	34.841
Hispanic (%)	4.549	7.562	0.000	69.898
Color (%)	39.952	33.399	0.000	100.000
Population Density (LN)	7.923	1.616	0.000	11.039
Below Poverty (%)	12.706	12.546	0.000	100.000
Owner Occupied Units (%)	59.716	24.794	0.000	100.000
Observations	649			

Table C. 174
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Peach Bottom Atomic Power Station

	rho	p	count
Black (%)	0.3496	0.0000	649
Asian (%)	0.2076	0.0000	649
Hispanic (%)	-0.0855	0.0293	649
Color (%)	0.3804	0.0000	649
Population Density (LN)	0.4108	0.0000	649
Below Poverty (%)	0.1773	0.0000	649
Owner Occupied Units (%)	-0.2861	0.0000	649

Table C. 175

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Peach Bottom Atomic Power Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0027***	0.0023***
			(5.648)	(4.147)
Asian (%)			0.0190***	0.0178***
			(6.756)	(6.223)
Hispanic (%)			-0.0055**	-0.0062***
			(-3.047)	(-3.307)
Color (%)	0.0024***	0.0023***		
	(4.869)	(4.026)		
Population Density (LN)	0.0670***	0.0673***	0.0666***	0.0662***
	(6.560)	(6.582)	(6.666)	(6.603)
Below Poverty (%)		-0.0038**		-0.0020
		(-2.620)		(-1.397)
Owner Occupied Units (%)		-0.0019*		-0.0018*
		(-2.512)		(-2.463)
Constant	2.8116***	2.9757***	2.7881***	2.9454***
	(38.841)	(30.431)	(40.034)	(31.196)
Observations	649	649	649	649
R-squared	0.198	0.209	0.262	0.269
F	79.8157	42.5692	57.1910	39.3933
Log-likelihood	-218.8491	-214.3792	-191.8703	-188.7870
Akaike Info Coefficient	443.6982	438.7584	393.7405	391.5740
Moran's I-Queen	0.8792***	0.8653***	0.8335***	0.82719***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 176

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Peach Bottom Atomic Power Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0000	0.0000
			(0.168)	(0.415)
Asian (%)			0.0004	0.0003
			(0.681)	(0.648)
Hispanic (%)			-0.0000	0.0000
			(-0.033)	(0.129)
Color (%)	0.0000	0.0000		
	(0.101)	(0.398)		
Population Density (LN)	0.0001	0.0003	0.0000	0.0002
	(0.062)	(0.145)	(0.013)	(0.087)
Below Poverty (%)		-0.0002		-0.0002
		(-0.697)		(-0.583)
Owner Occupied Units (%)		-0.0000		0.0000
		(-0.008)		(0.034)
Constant	0.0332+	0.0334	0.0342+	0.0337
	(1.819)	(1.506)	(1.848)	(1.502)
Spatial Autoregressive Coefficient (Rho)	0.9905***	0.9904***	0.9900***	0.9900***
	(213.169)	(211.327)	(204.828)	(204.521)
Observations	649	649	649	649
R-squared	0.9750	0.9750	0.9750	0.9750
Log-likelihood Queen	798.7454	799.0564	798.9769	799.2100
Akaike Info Coefficient	-1589.46	-1586.08	-1585.92	-1582.39
Moran's I-Queen	0.1678***	0.1672***	0.1682***	0.1676***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

50. Susquehanna Steam Electric Station, Pennsylvania

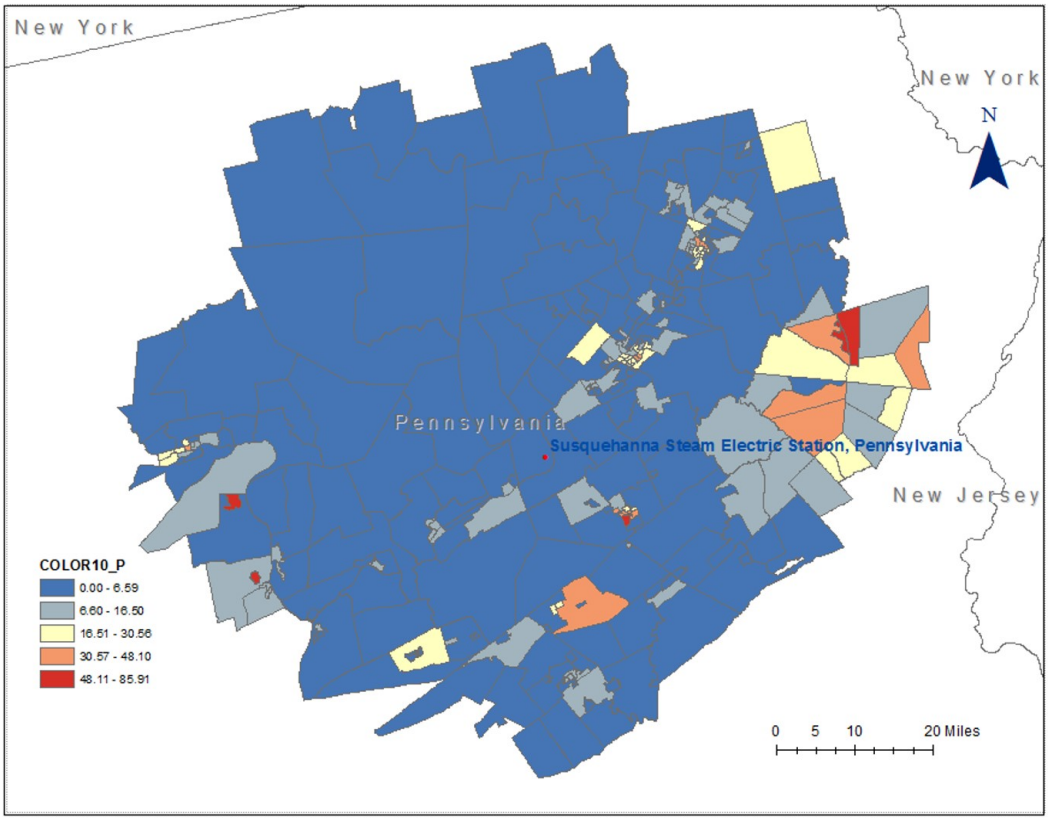

Figure C. 45 Spatial distribution of percent Color among the populations surrounding Susquehanna Steam Electric Station

Table C. 177
Descriptive Statistics for Study Variables at Susquehanna Steam Electric Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.205	0.518	0.493	3.909
Black (%)	3.561	6.849	0.000	50.656
Asian (%)	0.946	1.649	0.000	16.418
Hispanic (%)	4.382	7.588	0.000	54.974
Color (%)	9.769	12.385	0.000	85.911
Population Density (LN)	6.626	1.819	0.000	9.831
Below Poverty (%)	13.862	9.078	0.000	65.091
Owner Occupied Units (%)	60.614	17.178	0.000	100.000
Observations	319			

Table C. 178
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Susquehanna Steam Electric Station

	rho	p	count
Black (%)	0.1158	0.0386	319
Asian (%)	0.0458	0.4151	319
Hispanic (%)	-0.0852	0.1287	319
Color (%)	0.0349	0.5344	319
Population Density (LN)	-0.0523	0.3514	319
Below Poverty (%)	-0.0354	0.5290	319
Owner Occupied Units (%)	-0.0418	0.4572	319

Table C. 179

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Susquehanna Steam Electric Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0139**	0.0127**
			(2.966)	(2.613)
Asian (%)			0.0097	0.0079
			(0.547)	(0.441)
Hispanic (%)			-0.0105*	-0.0109*
			(-2.441)	(-2.496)
Color (%)	0.0023	0.0013		
	(0.928)	(0.495)		
Population Density (LN)	-0.0193	-0.0189	-0.0124	-0.0132
	(-1.160)	(-1.022)	(-0.747)	(-0.716)
Below Poverty (%)		-0.0043		-0.0032
		(-1.016)		(-0.764)
Owner Occupied Units (%)		-0.0030		-0.0026
		(-1.319)		(-1.142)
Constant	3.3107***	3.5620***	3.2740***	3.4902***
	(30.093)	(16.082)	(30.008)	(15.903)
Observations	319	319	319	319
R-squared	0.005	0.011	0.038	0.042
F	0.8660	0.9124	3.1131	2.2967
Log-likelihood	-241.3474	-240.3761	-236.0161	-235.3258
Akaike Info Coefficient	488.6949	490.7522	482.0321	484.6517
Moran's I-Queen	0.9155***	0.9105***	0.8953***	0.8916***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 180

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Susquehanna Steam Electric Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0000	-0.0004
			(-0.019)	(-0.317)
Asian (%)			0.0026	0.0024
			(0.587)	(0.547)
Hispanic (%)			-0.0004	-0.0006
			(-0.357)	(-0.553)
Color (%)	-0.0001	-0.0004		
	(-0.121)	(-0.575)		
Population Density (LN)	-0.0040	-0.0057	-0.0040	-0.0059
	(-0.989)	(-1.272)	(-0.990)	(-1.310)
Below Poverty (%)		0.0000		0.0001
		(0.047)		(0.115)
Owner Occupied Units (%)		-0.0006		-0.0005
		(-1.006)		(-0.982)
Constant	0.1231**	0.1713**	0.1234**	0.1703**
	(2.789)	(2.621)	(2.783)	(2.607)
Spatial Autoregressive Coefficient (Rho)	0.9721***	0.9719***	0.9717***	0.9715***
	(90.464)	(90.196)	(89.058)	(88.912)
Observations	319	319	319	319
R-squared	0.9413	0.9413	0.9414	0.9416
Log-likelihood Queen	157.0086	157.7078	157.2519	157.9776
Akaike Info Coefficient	-306.02	-303.80	-302.50	-299.95
Moran's I-Queen	0.1547**	0.1578**	0.0521*	0.1564*

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

51. Three Mile Island Nuclear Station, Pennsylvania

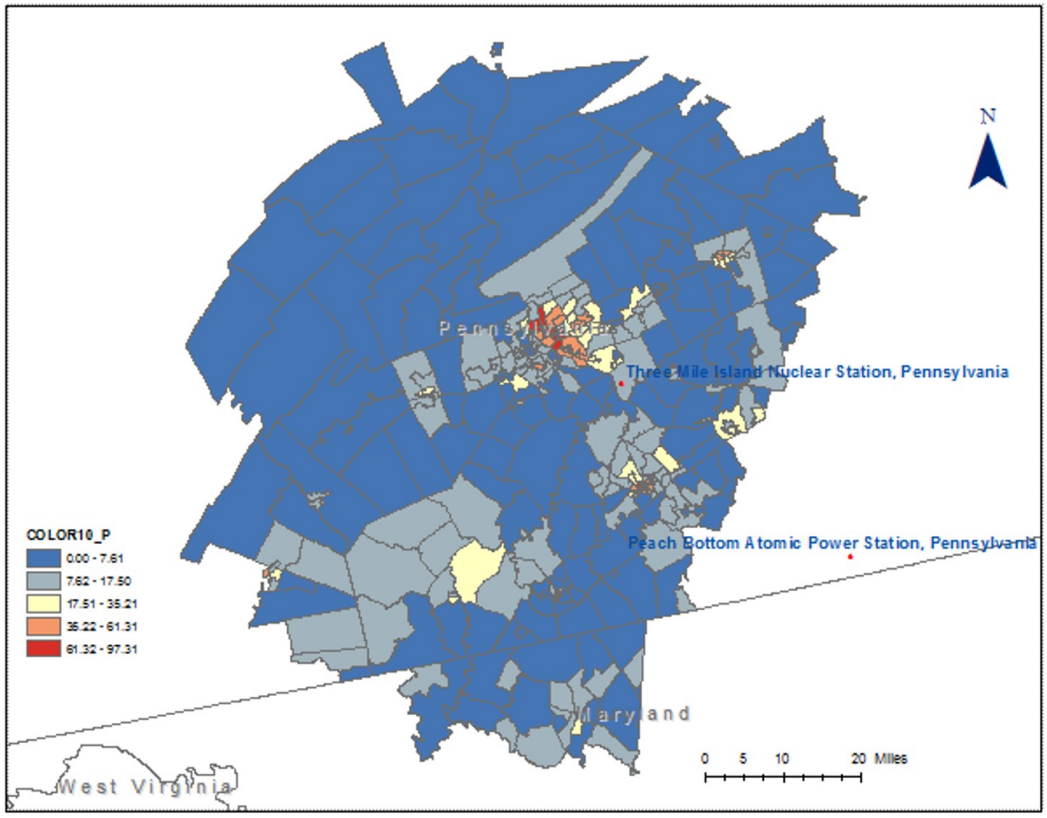

Figure C. 46 Spatial distribution of percent Color among the populations surrounding Three Mile Island Nuclear Station

Table C. 181
Descriptive Statistics for Study Variables at Three Mile Island Nuclear Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	2.918	0.611	0.976	3.907
Black (%)	6.973	13.719	0.000	83.997
Asian (%)	1.595	2.064	0.000	12.765
Hispanic (%)	5.455	8.093	0.000	58.622
Color (%)	15.454	19.291	0.000	97.308
Population Density (LN)	6.757	1.535	2.884	10.013
Below Poverty (%)	10.389	10.309	0.000	53.585
Owner Occupied Units (%)	67.166	19.887	0.000	100.000
Observations	336			

Table C. 182
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Three Mile Island Nuclear Station

	rho	p	count
Black (%)	-0.2736	0.0000	336
Asian (%)	-0.2968	0.0000	336
Hispanic (%)	-0.1596	0.0033	336
Color (%)	-0.3049	0.0000	336
Population Density (LN)	-0.4022	0.0000	336
Below Poverty (%)	-0.0664	0.2248	336
Owner Occupied Units (%)	0.1290	0.0180	336

Table C. 183

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Three Mile Island Nuclear Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0059*	-0.0108***
			(-2.308)	(-3.943)
Asian (%)			-0.0622***	-0.0548***
			(-4.116)	(-3.651)
Hispanic (%)			0.0033	-0.0084
			(0.754)	(-1.613)
Color (%)	-0.0032	-0.0115***		
	(-1.626)	(-4.765)		
Population Density (LN)	-0.1360***	-0.1617***	-0.1215***	-0.1487***
	(-5.495)	(-6.430)	(-4.906)	(-5.826)
Below Poverty (%)		0.0187***		0.0137**
		(3.931)		(2.639)
Owner Occupied Units (%)		-0.0034		-0.0040+
		(-1.458)		(-1.733)
Constant	3.8863***	4.2226***	3.8611***	4.2604***
	(25.214)	(15.039)	(25.524)	(15.229)
Observations	336	336	336	336
R-squared	0.168	0.239	0.215	0.257
F	33.7080	25.9842	22.6135	19.0044
Log-likelihood	-279.4945	-264.5895	-269.8798	-260.4752
Akaike Info Coefficient	564.9890	539.1789	549.7596	534.9505
Moran's I-Queen	0.8958***	0.8485***	0.8573***	0.8368***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 184

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Three Mile Island Nuclear Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0002	0.0002
			(0.671)	(0.581)
Asian (%)			0.0010	0.0010
			(0.507)	(0.519)
Hispanic (%)			0.0001	0.0001
			(0.158)	(0.077)
Color (%)	0.0002	0.0002		
	(0.653)	(0.532)		
Population Density (LN)	-0.0058+	-0.0058+	-0.0061+	-0.0061+
	(-1.852)	(-1.740)	(-1.902)	(-1.790)
Below Poverty (%)		-0.0000		0.0001
		(-0.033)		(0.111)
Owner Occupied Units (%)		0.0000		0.0000
		(0.002)		(0.065)
Constant	0.0573*	0.0572	0.0577*	0.0557
	(2.506)	(1.458)	(2.530)	(1.414)
Spatial Autoregressive Coefficient (Rho)	0.9949***	0.9949***	0.9951***	0.9951***
	(320.202)	(318.175)	(326.831)	(324.278)
Observations	336	336	336	336
R-squared	0.9866	0.9866	0.9866	0.9866
Log-likelihood Queen	346.7232	346.7240	346.8825	346.8888
Akaike Info Coefficient	-685.45	-681.45	-681.77	-677.78
Moran's I-Queen	0.1954***	0.1955***	0.1967***	0.1966***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

52. Catawba Nuclear Station, South Carolina

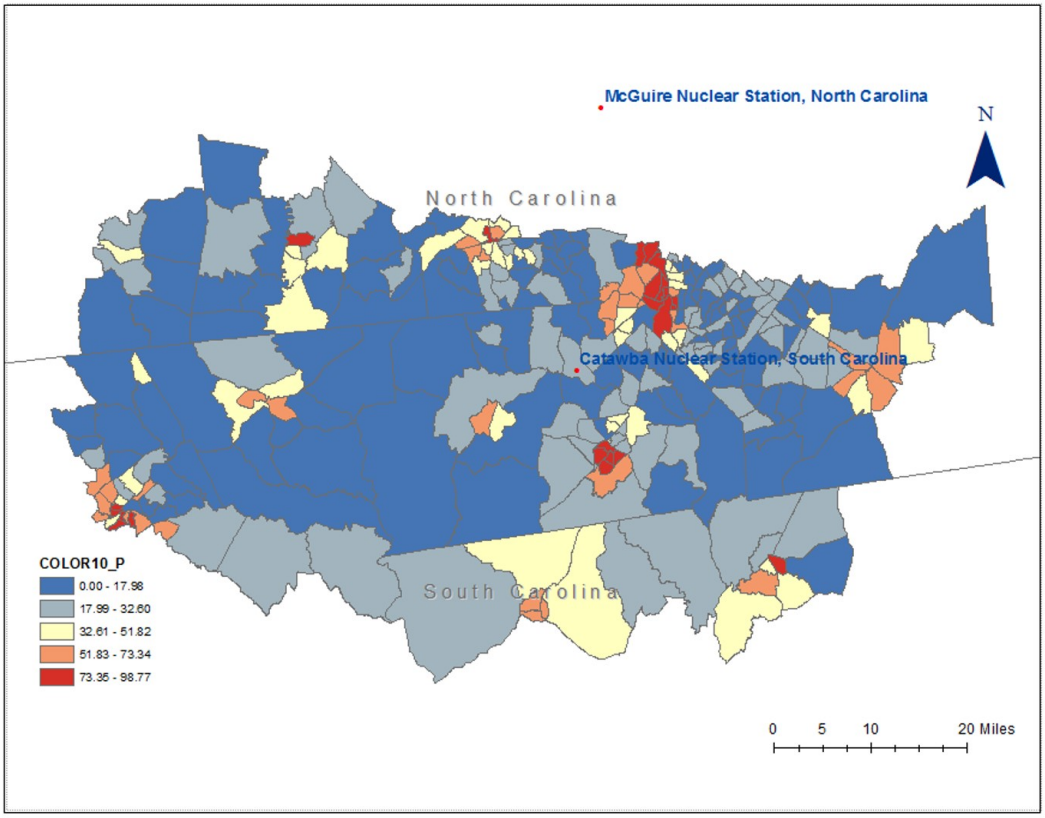

Figure C. 47 Spatial distribution of percent Color among the populations surrounding Catawba Nuclear Station

Table C. 185
Descriptive Statistics for Study Variables at Catawba Nuclear Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	2.886	0.621	0.008	3.904
Black (%)	20.673	21.231	0.000	98.774
Asian (%)	2.396	3.987	0.000	38.225
Hispanic (%)	6.786	9.104	0.000	71.391
Color (%)	31.476	23.564	0.000	98.774
Population Density (LN)	6.638	1.314	0.000	9.451
Below Poverty (%)	14.794	11.854	0.000	66.645
Owner Occupied Units (%)	62.228	21.480	0.000	100.000
Observations	297			

Table C. 186
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Catawba Nuclear Station

	rho	p	count
Black (%)	0.1489	0.0102	297
Asian (%)	-0.2382	0.0000	297
Hispanic (%)	-0.1562	0.0070	297
Color (%)	0.0258	0.6579	297
Population Density (LN)	-0.2052	0.0004	297
Below Poverty (%)	0.2719	0.0000	297
Owner Occupied Units (%)	-0.0917	0.1149	297

Table C. 187

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Catawba Nuclear Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0051**	-0.0008
			(3.049)	(-0.343)
Asian (%)			-0.0253**	-0.0220*
			(-2.803)	(-2.478)
Hispanic (%)			-0.0057	-0.0093*
			(-1.450)	(-2.276)
Color (%)	0.0031+	-0.0036+		
	(1.952)	(-1.656)		
Population Density (LN)	-0.1181***	-0.0839**	-0.0850**	-0.0673*
	(-4.086)	(-2.947)	(-2.923)	(-2.346)
Below Poverty (%)		0.0209***		0.0166***
		(5.064)		(3.902)
Owner Occupied Units (%)		0.0012		0.0006
		(0.563)		(0.299)
Constant	3.5712***	3.1696***	3.4438***	3.1787***
	(19.557)	(11.993)	(19.116)	(12.178)
Observations	297	297	297	297
R-squared	0.054	0.137	0.115	0.164
F	8.4527	11.6349	9.4710	9.5047
Log-likelihood	-271.2543	-257.5955	-261.4416	-252.8974
Akaike Info Coefficient	548.5086	525.1911	532.8833	519.7949
Moran's I-Queen	0.9178***	0.8663***	0.8774***	0.8678***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 188

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Catawba Nuclear Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0005	-0.0002
			(1.503)	(-0.356)
Asian (%)			-0.0003	-0.0004
			(-0.204)	(-0.238)
Hispanic (%)			-0.0005	-0.0010
			(-0.627)	(-1.286)
Color (%)	0.0003	-0.0003		
	(1.083)	(-0.826)		
Population Density (LN)	-0.0071	-0.0052	-0.0056	-0.0044
	(-1.328)	(-0.950)	(-1.015)	(-0.799)
Below Poverty (%)		0.0011		0.0009
		(1.396)		(1.135)
Owner Occupied Units (%)		-0.0005		-0.0005
		(-1.130)		(-1.208)
Constant	0.0754+	0.1019+	0.0729+	0.1037+
	(1.826)	(1.838)	(1.735)	(1.863)
Spatial Autoregressive Coefficient (Rho)	0.9885***	0.9864***	0.9873***	0.9858***
	(145.438)	(132.515)	(137.121)	(129.336)
Observations	297	297	297	297
R-squared	0.9677	0.9682	0.9678	0.9682
Log-likelihood Queen	176.2651	178.9130	177.1509	179.4404
Akaike Info Coefficient	-344.53	-344.83	-342.30	-342.88
Moran's I-Queen	0.1021***	0.099***	0.104***	0.1011***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

53. H. B. Robinson Steam Electric Plant, South Carolina

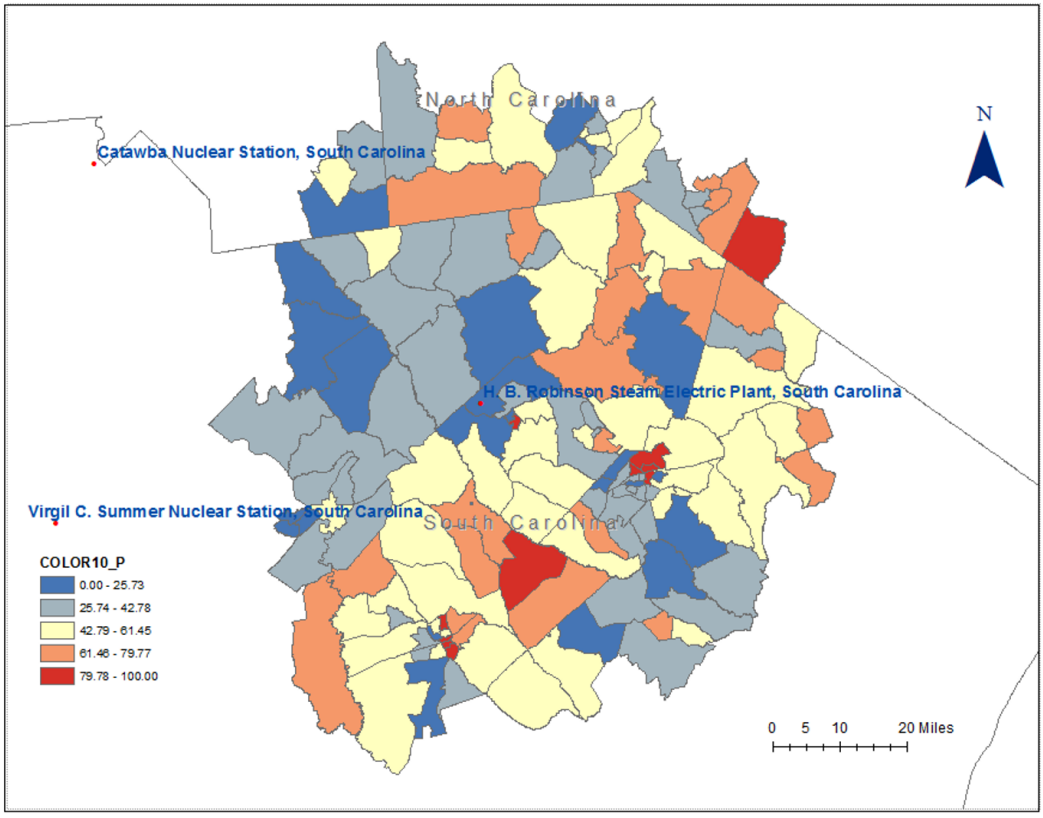

Figure C. 48 Spatial distribution of percent Color among the populations surrounding H. B. Robinson Steam Electric Plant

Table C. 189
Descriptive Statistics for Study Variables at H. B. Robinson Steam Electric Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.360	0.489	1.539	3.900
Black (%)	42.007	22.356	0.000	100.000
Asian (%)	0.578	0.989	0.000	4.631
Hispanic (%)	2.453	3.128	0.000	17.789
Color (%)	47.554	21.869	0.000	100.000
Population Density (LN)	5.125	1.484	0.000	9.344
Below Poverty (%)	21.997	12.527	0.000	100.000
Owner Occupied Units (%)	58.651	16.110	0.000	86.191
Observations	148			

Table C. 190
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at H. B. Robinson Steam Electric Plant

	rho	p	count
Black (%)	0.0997	0.2281	148
Asian (%)	0.1180	0.1532	148
Hispanic (%)	0.0793	0.3379	148
Color (%)	0.1670	0.0425	148
Population Density (LN)	0.0284	0.7314	148
Below Poverty (%)	0.1148	0.1649	148
Owner Occupied Units (%)	-0.0835	0.3131	148

Table C. 191

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at H. B. Robinson Steam Electric Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0035+	0.0023
			(1.848)	(1.095)
Asian (%)			0.0806+	0.0928*
			(1.833)	(2.065)
Hispanic (%)			0.0145	0.0155
			(1.113)	(1.188)
Color (%)	0.0037*	0.0032		
	(2.013)	(1.477)		
Population Density (LN)	0.0028	0.0040	-0.0126	-0.0101
	(0.103)	(0.142)	(-0.440)	(-0.347)
Below Poverty (%)		0.0016		0.0054
		(0.392)		(1.283)
Owner Occupied Units (%)		-0.0001		0.0003
		(-0.032)		(0.092)
Constant	3.1688***	3.1563***	3.1929***	3.0857***
	(19.756)	(9.945)	(20.103)	(9.648)
Observations	148	148	148	148
R-squared	0.028	0.029	0.042	0.055
F	2.0856	1.0823	1.5545	1.3660
Log-likelihood	-101.5119	-101.4035	-100.4609	-99.4295
Akaike Info Coefficient	209.0237	212.8070	210.9219	212.8590
Moran's I-Queen	0.8700***	0.8684***	0.8561***	0.8408***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 192

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at H. B. Robinson Steam Electric Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0007+	0.0008+
			(1.898)	(1.765)
Asian (%)			0.0123	0.0136
			(1.364)	(1.485)
Hispanic (%)			0.0037	0.0039
			(1.409)	(1.468)
Color (%)	0.0007+	0.0008+		
	(1.851)	(1.911)		
Population Density (LN)	-0.0092+	-0.0083	-0.0119*	-0.0106+
	(-1.649)	(-1.441)	(-2.038)	(-1.794)
Below Poverty (%)		0.0000		0.0006
		(0.045)		(0.737)
Owner Occupied Units (%)		0.0006		0.0007
		(0.902)		(1.041)
Constant	0.0492	0.0029	0.0493	-0.0117
	(1.222)	(0.043)	(1.229)	(-0.169)
Spatial Autoregressive Coefficient (Rho)	0.9916***	0.9918***	0.9914***	0.9914***
	(135.445)	(138.042)	(133.177)	(133.621)
Observations	148	148	148	148
R-squared	0.9580	0.9583	0.9586	0.9590
Log-likelihood Queen	100.8127	101.3024	101.9334	102.5131
Akaike Info Coefficient	-193.63	-190.61	-191.87	-189.03
Moran's I-Queen	0.1466***	0.1489***	0.1301***	0.1295***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

54. Oconee Nuclear Station, South Carolina

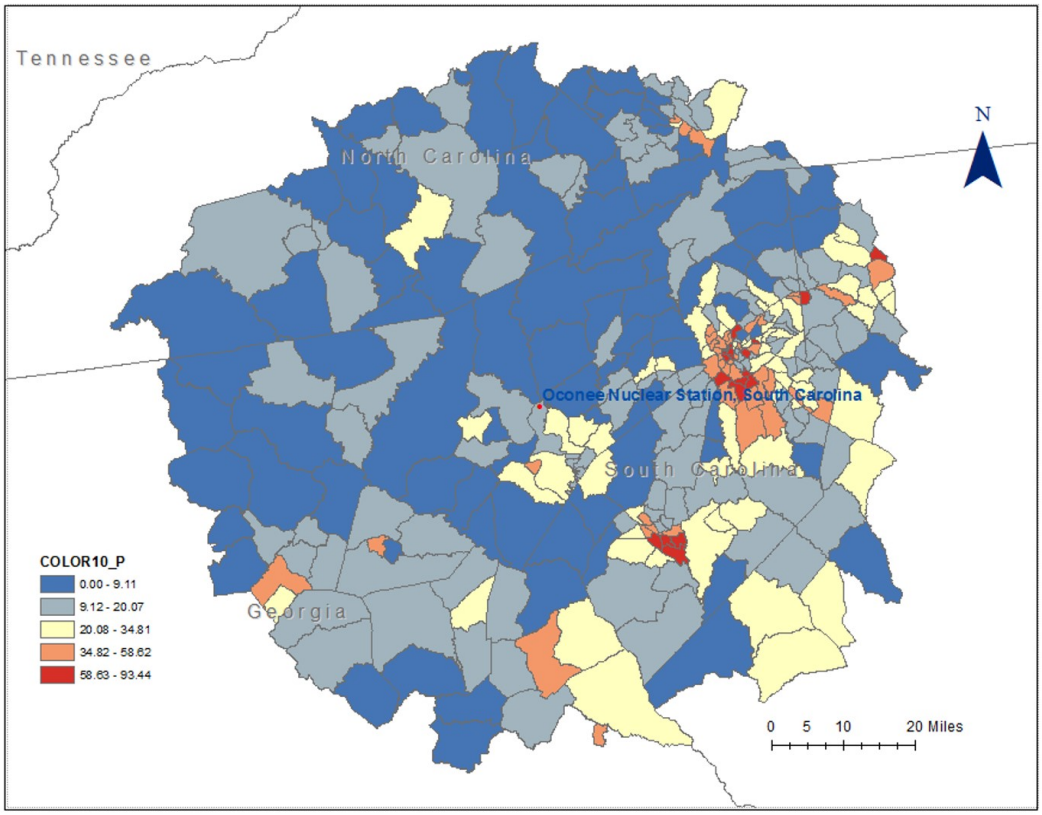

Figure C. 49 Spatial distribution of percent Color among the populations surrounding Oconee Nuclear Station

Table C. 193
Descriptive Statistics for Study Variables at Oconee Nuclear Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.363	0.480	0.273	3.908
Black (%)	13.407	16.859	0.000	89.915
Asian (%)	1.201	2.051	0.000	15.832
Hispanic (%)	5.498	6.639	0.000	36.883
Color (%)	21.589	18.862	0.000	93.445
Population Density (LN)	5.931	1.415	0.000	9.031
Below Poverty (%)	16.335	10.265	0.000	56.166
Owner Occupied Units (%)	59.901	17.175	0.000	98.988

Table C. 194
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Oconee Nuclear Station

	rho	p	count
Black (%)	-0.0279	0.6174	323
Asian (%)	-0.0237	0.6716	323
Hispanic (%)	0.0869	0.1189	323
Color (%)	0.0060	0.9148	323
Population Density (LN)	-0.0552	0.3224	323
Below Poverty (%)	-0.1482	0.0076	323
Owner Occupied Units (%)	0.0866	0.1202	323

Table C. 195

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Oconee Nuclear Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0000	0.0062**
			(0.009)	(2.739)
Asian (%)			-0.0022	-0.0008
			(-0.159)	(-0.060)
Hispanic (%)			0.0085*	0.0174***
			(1.994)	(3.765)
Color (%)	0.0013	0.0075***		
	(0.784)	(3.337)		
Population Density (LN)	-0.0286	-0.0555*	-0.0313	-0.0591*
	(-1.258)	(-2.393)	(-1.342)	(-2.499)
Below Poverty (%)		-0.0125***		-0.0135***
		(-3.510)		(-3.754)
Owner Occupied Units (%)		0.0018		0.0019
		(0.963)		(1.035)
Constant	3.5033***	3.6255***	3.5037***	3.6382***
	(28.854)	(19.807)	(28.640)	(19.942)
Observations	323	323	323	323
R-squared	0.005	0.056	0.016	0.073
F	0.7975	4.7109	1.2537	4.1596
Log-likelihood	-220.2681	-211.7739	-218.5442	-208.7943
Akaike Info Coefficient	446.5361	433.5477	447.0884	431.5887
Moran's I-Queen	0.8792***	0.8355***	0.8722***	0.8181***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 196

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Oconee Nuclear Station

Index_54 Lag

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0001	-0.0000
			(-0.269)	(-0.067)
Asian (%)			-0.0082*	-0.0082*
			(-2.491)	(-2.471)
Hispanic (%)			0.0007	0.0008
			(0.692)	(0.720)
Color (%)	0.0001	0.0001		
	(0.284)	(0.240)		
Population Density (LN)	-0.0053	-0.0055	-0.0023	-0.0026
	(-0.975)	(-0.950)	(-0.407)	(-0.452)
Below Poverty (%)		0.0001		-0.0002
		(0.100)		(-0.212)
Owner Occupied Units (%)		0.0001		0.0000
		(0.206)		(0.031)
Constant	0.0691+	0.0621	0.0594	0.0628
	(1.772)	(1.181)	(1.540)	(1.203)
Spatial Autoregressive Coefficient (Rho)	0.9892***	0.9892***	0.9897***	0.9894***
	(133.726)	(132.630)	(137.004)	(134.133)
Observations	323	323	323	323
R-squared	0.9415	0.9415	0.9427	0.9427
Log-likelihood Queen	181.3340	181.3560	184.6840	184.7117
Akaike Info Coefficient	-354.67	-350.71	-357.37	-353.42
Moran's I-Queen	0.0901***	0.0900***	0.0847***	0.0841***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

55. Virgil C. Summer Nuclear Station, South Carolina

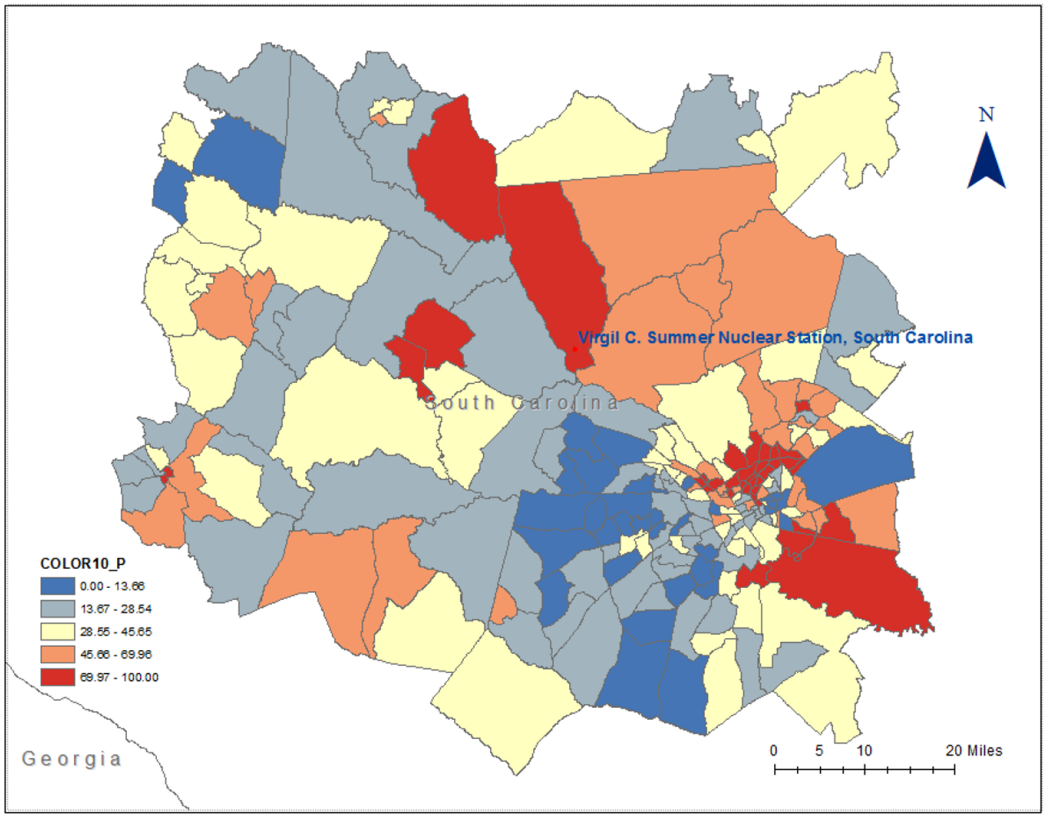

Figure C. 50 Spatial distribution of percent Color among the populations surrounding Virgil C. Summer Nuclear Station

Table C. 197
Descriptive Statistics for Study Variables at Virgil C. Summer Nuclear Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.269	0.333	2.041	3.894
Black (%)	31.921	26.057	0.000	100.000
Asian (%)	1.470	2.254	0.000	12.577
Hispanic (%)	4.256	5.689	0.000	37.067
Color (%)	39.017	26.472	0.000	100.000
Population Density (LN)	6.225	1.691	0.000	9.010
Below Poverty (%)	16.362	13.732	0.000	96.226
Owner Occupied Units (%)	58.701	22.026	0.000	100.000
Observations	222			

Table C. 198
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Virgil C. Summer Nuclear Station

	rho	p	count
Black (%)	-0.0596	0.3769	222
Asian (%)	-0.0303	0.6533	222
Hispanic (%)	0.1010	0.1337	222
Color (%)	-0.0445	0.5093	222
Population Density (LN)	-0.1018	0.1304	222
Below Poverty (%)	0.1089	0.1055	222
Owner Occupied Units (%)	-0.0898	0.1823	222

Table C. 199

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Virgil C. Summer Nuclear Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0004	-0.0017+
			(-0.475)	(-1.700)
Asian (%)			-0.0017	-0.0011
			(-0.163)	(-0.102)
Hispanic (%)			0.0063	0.0056
			(1.589)	(1.423)
Color (%)	-0.0002	-0.0015		
	(-0.231)	(-1.446)		
Population Density (LN)	-0.0191	-0.0219	-0.0190	-0.0226
	(-1.382)	(-1.585)	(-1.304)	(-1.557)
Below Poverty (%)		0.0031		0.0036
		(1.465)		(1.609)
Owner Occupied Units (%)		-0.0014		-0.0012
		(-1.094)		(-0.860)
Constant	3.3956***	3.4947***	3.3765***	3.4521***
	(39.570)	(24.714)	(38.722)	(23.903)
Observations	222	222	222	222
R-squared	0.011	0.039	0.023	0.053
F	1.1741	2.1907	1.2776	1.9966
Log-likelihood	-68.9790	-65.7686	-67.5790	-64.1441
Akaike Info Coefficient	143.9579	141.5372	145.1580	142.2883
Moran's I-Queen	0.8458***	0.8232***	0.8375***	0.8130***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 200

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Virgil C. Summer Nuclear Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0001	-0.0003
			(-0.574)	(-1.038)
Asian (%)			-0.0005	0.0004
			(-0.173)	(0.131)
Hispanic (%)			0.0009	0.0009
			(0.848)	(0.847)
Color (%)	-0.0001	-0.0002		
	(-0.434)	(-0.882)		
Population Density (LN)	-0.0051	-0.0051	-0.0051	-0.0054
	(-1.339)	(-1.317)	(-1.252)	(-1.344)
Below Poverty (%)		0.0007		0.0008
		(1.156)		(1.292)
Owner Occupied Units (%)		0.0001		0.0001
		(0.232)		(0.387)
Constant	0.0922*	0.0835	0.0903*	0.0769
	(2.168)	(1.536)	(2.096)	(1.392)
Spatial Autoregressive Coefficient (Rho)	0.9850***	0.9844***	0.9846***	0.9839***
	(93.698)	(91.033)	(92.018)	(89.150)
Observations	222	222	222	222
R-squared	0.9232	0.9236	0.9235	0.9240
Log-likelihood Queen	176.4659	177.1993	176.9129	177.8086
Akaike Info Coefficient	-344.93	-342.40	-341.83	-339.62
Moran's I-Queen	0.2364***	0.2297***	0.2368***	0.229***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

56. Sequoyah Nuclear Plant, Tennessee

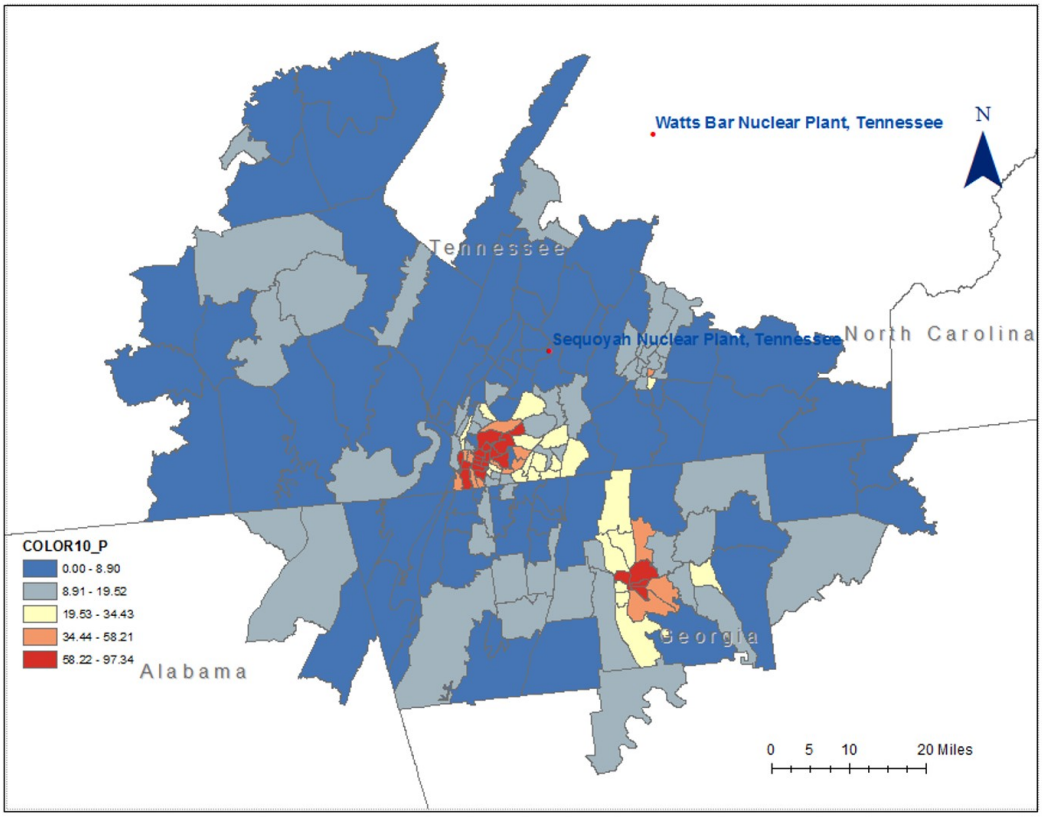

Figure C. 51 Spatial distribution of percent Color among the populations surrounding Sequoyah Nuclear Plant

Table C. 201

Descriptive Statistics for Study Variables at Sequoyah Nuclear Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	2.962	0.612	0.570	3.900
Black (%)	11.357	20.847	0.000	92.778
Asian (%)	1.028	1.840	0.000	12.889
Hispanic (%)	6.401	11.140	0.000	70.634
Color (%)	20.645	23.502	0.000	97.344
Population Density (LN)	5.950	1.584	0.000	8.283
Below Poverty (%)	17.564	11.682	0.000	66.728
Owner Occupied Units (%)	60.760	17.852	0.000	100.000
Observations	190			

Table C. 202

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Sequoyah Nuclear Plant

	rho	p	count
Black (%)	-0.1419	0.0509	190
Asian (%)	-0.1485	0.0408	190
Hispanic (%)	0.2167	0.0027	190
Color (%)	-0.0133	0.8555	190
Population Density (LN)	-0.3823	0.0000	190
Below Poverty (%)	0.1890	0.0090	190
Owner Occupied Units (%)	-0.0651	0.3724	190

Table C. 203

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Sequoyah Nuclear Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0024	-0.0021
			(1.090)	(-0.853)
Asian (%)			-0.0084	-0.0055
			(-0.371)	(-0.249)
Hispanic (%)			0.0187***	0.0145***
			(5.153)	(3.861)
Color (%)	0.0067**	0.0023		
	(3.324)	(0.922)		
Population Density (LN)	-0.1991***	-0.1902***	-0.1916***	-0.1854***
	(-6.701)	(-6.292)	(-6.276)	(-6.100)
Below Poverty (%)		0.0106*		0.0112*
		(2.058)		(2.261)
Owner Occupied Units (%)		-0.0019		-0.0023
		(-0.578)		(-0.713)
Constant	4.0093***	3.9751***	3.9644***	3.9431***
	(24.427)	(11.538)	(24.178)	(11.899)
Observations	190	190	190	190
R-squared	0.194	0.229	0.256	0.298
F	22.4747	13.7547	15.8927	12.9687
Log-likelihood	-155.2008	-150.9305	-147.6045	-142.0049
Akaike Info Coefficient	316.4017	311.8610	305.2090	298.0099
Moran's I-Queen	0.8141***	0.8006***	0.7891***	0.7617***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 204

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Sequoyah Nuclear Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0007	0.0000
			(1.225)	(0.009)
Asian (%)			0.0044	0.0043
			(0.786)	(0.781)
Hispanic (%)			0.0013	0.0007
			(1.378)	(0.755)
Color (%)	0.0007	0.0001		
	(1.515)	(0.162)		
Population Density (LN)	-0.0237**	-0.0239**	-0.0257**	-0.0261**
	(-3.194)	(-3.147)	(-3.287)	(-3.289)
Below Poverty (%)		0.0010		0.0011
		(0.774)		(0.897)
Owner Occupied Units (%)		-0.0008		-0.0007
		(-0.997)		(-0.911)
Constant	0.1940**	0.2462*	0.2043**	0.2506*
	(3.154)	(2.558)	(3.228)	(2.571)
Spatial Autoregressive Coefficient (Rho)	0.9791***	0.9769***	0.9781***	0.9750***
	(80.358)	(76.362)	(77.182)	(72.252)
Observations	190	190	190	190
R-squared	0.9535	0.9541	0.9536	0.9543
Log-likelihood Queen	82.9052	84.6497	83.3966	85.2738
Akaike Info Coefficient	-157.81	-157.30	-154.79	-154.55
Moran's I-Queen	0.0997***	0.0945*	0.0997*	0.0945*

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

57. Watts Bar Nuclear Plant, Tennessee

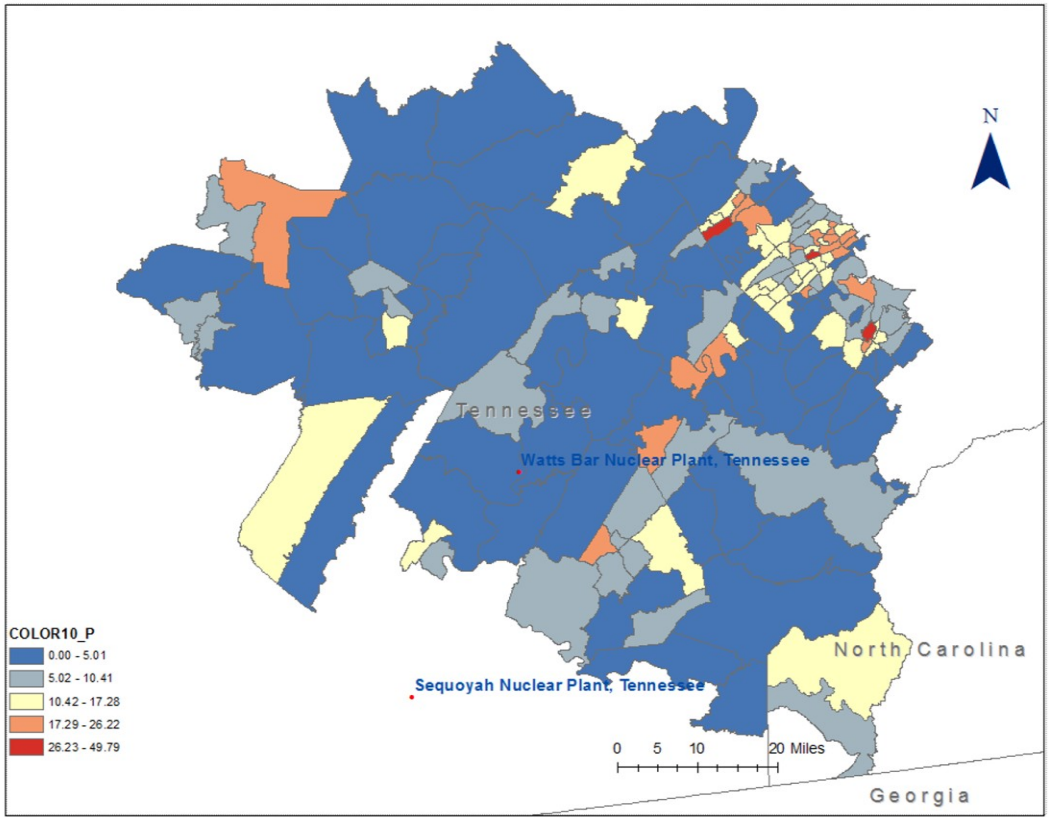

Figure C. 52 Spatial distribution of percent Color among the populations surrounding Watts Bar Nuclear Plant

Table C. 205
Descriptive Statistics for Study Variables at Watts Bar Nuclear Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.508	0.441	1.734	3.907
Black (%)	3.406	5.139	0.000	35.836
Asian (%)	1.339	2.410	0.000	14.512
Hispanic (%)	2.983	3.676	0.000	19.504
Color (%)	9.353	8.063	0.000	49.791
Population Density (LN)	5.673	1.600	0.000	8.198
Below Poverty (%)	13.486	8.849	0.000	37.161
Owner Occupied Units (%)	67.111	17.820	0.000	100.000
Observations	158			

Table C. 206
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Watts Bar Nuclear Plant

	rho	p	count
Black (%)	0.1374	0.0852	158
Asian (%)	0.2121	0.0075	158
Hispanic (%)	0.0991	0.2153	158
Color (%)	0.2179	0.0059	158
Population Density (LN)	0.3462	0.0000	158
Below Poverty (%)	-0.2175	0.0061	158
Owner Occupied Units (%)	0.0196	0.8073	158

Table C. 207

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Watts Bar Nuclear Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0007	0.0009
			(-0.094)	(0.118)
Asian (%)			0.0168	0.0108
			(1.096)	(0.701)
Hispanic (%)			0.0018	0.0056
			(0.180)	(0.547)
Color (%)	0.0021	0.0043		
	(0.419)	(0.776)		
Population Density (LN)	0.0897***	0.0754**	0.0852**	0.0764**
	(3.597)	(2.883)	(3.333)	(2.900)
Below Poverty (%)		-0.0114**		-0.0110*
		(-2.650)		(-2.469)
Owner Occupied Units (%)		-0.0018		-0.0020
		(-0.761)		(-0.849)
Constant	2.9799***	3.3113***	2.9994***	3.3200***
	(23.555)	(14.806)	(22.982)	(14.763)
Observations	158	158	158	158
R-squared	0.121	0.160	0.127	0.161
F	10.6545	7.2979	5.5529	4.8225
Log-likelihood	-84.2266	-80.6078	-83.6938	-80.5528
Akaike Info Coefficient	174.4533	171.2156	177.3876	175.1056
Moran's I-Queen	0.8235***	0.8198***	0.8227***	0.8199***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 208

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Watts Bar Nuclear Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0005	0.0009
			(0.299)	(0.496)
Asian (%)			0.0012	0.0014
			(0.342)	(0.395)
Hispanic (%)			0.0006	0.0010
			(0.278)	(0.434)
Color (%)	0.0009	0.0014		
	(0.786)	(1.065)		
Population Density (LN)	-0.0041	-0.0055	-0.0034	-0.0044
	(-0.716)	(-0.908)	(-0.583)	(-0.711)
Below Poverty (%)		0.0001		0.0001
		(0.087)		(0.141)
Owner Occupied Units (%)		0.0004		0.0003
		(0.766)		(0.627)
Constant	0.0686+	0.0432	0.0682	0.0455
	(1.667)	(0.703)	(1.622)	(0.740)
Spatial Autoregressive Coefficient (Rho)	0.9865***	0.9866***	0.9864***	0.9866***
	(99.178)	(99.137)	(98.660)	(99.057)
Observations	158	158	158	158
R-squared	0.9461	0.9462	0.9461	0.9463
Log-likelihood Queen	116.7138	117.0402	116.5478	116.7520
Akaike Info Coefficient	-683.56	-680.68	-679.90	-676.95
Moran's I-Queen	0.2641***	0.2605***	0.2637***	0.2605***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

58. Comanche Peak Steam Electric Station, Texas

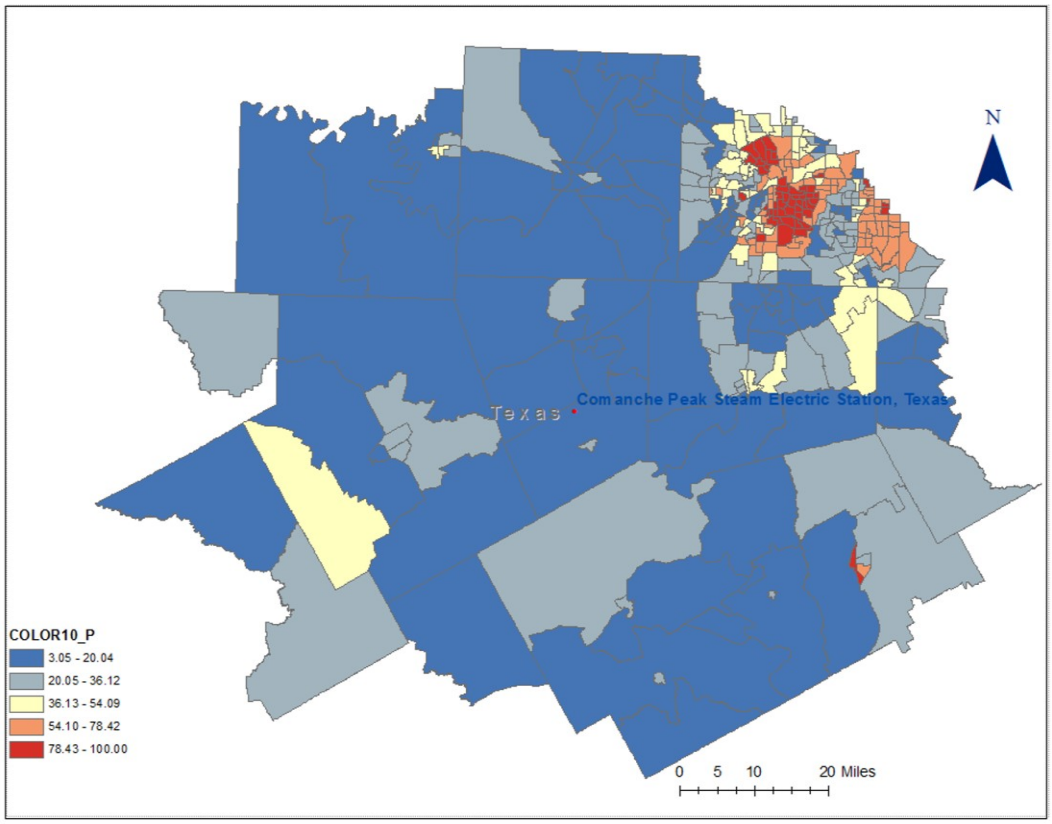

Figure C. 53 Spatial distribution of percent Color among the populations surrounding Comanche Peak Steam Electric Station

Table C. 209

Descriptive Statistics for Study Variables at Comanche Peak Steam Electric Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.619	0.337	1.616	3.911
Black (%)	13.050	17.140	0.000	91.473
Asian (%)	2.891	4.203	0.000	29.774
Hispanic (%)	25.446	20.557	0.000	97.858
Color (%)	43.080	27.457	3.047	100.000
Population Density (LN)	7.105	1.667	1.837	9.301
Below Poverty (%)	15.734	12.047	0.343	82.304
Owner Occupied Units (%)	59.507	19.763	0.000	100.000
Observations	362			

Table C. 210

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Comanche Peak Steam Electric Station

	rho	p	count
Black (%)	0.2332	0.0000	362
Asian (%)	0.2601	0.0000	362
Hispanic (%)	0.1954	0.0002	362
Color (%)	0.3339	0.0000	362
Population Density (LN)	0.3627	0.0000	362
Below Poverty (%)	0.1062	0.0434	362
Owner Occupied Units (%)	-0.1021	0.0524	362

Table C. 211

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Comanche Peak Steam Electric Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0027**	0.0033**
			(2.685)	(2.897)
Asian (%)			0.0146***	0.0142***
			(3.574)	(3.441)
Hispanic (%)			0.0019*	0.0025*
			(2.147)	(2.405)
Color (%)	0.0024***	0.0035***		
	(3.450)	(3.947)		
Population Density (LN)	0.0522***	0.0477***	0.0444***	0.0428***
	(4.523)	(4.028)	(3.778)	(3.573)
Below Poverty (%)		-0.0038+		-0.0021
		(-1.829)		(-0.995)
Owner Occupied Units (%)		-0.0003		-0.0001
		(-0.318)		(-0.077)
Constant	3.1441***	3.2081***	3.1786***	3.2047***
	(43.296)	(27.373)	(43.664)	(27.429)
Observations	362	362	362	362
R-squared	0.159	0.169	0.181	0.184
F	34.0415	18.0958	19.7541	13.3547
Log-likelihood	-87.9284	-85.9449	-83.1702	-82.5224
Akaike Info Coefficient	181.8568	181.8898	176.3404	179.0447
Moran's I-Queen	0.8140***	0.8087***	0.801***	0.80155***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 212

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Comanche Peak Steam Electric Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0002	0.0002
			(0.777)	(0.689)
Asian (%)			0.0007	0.0007
			(0.712)	(0.666)
Hispanic (%)			0.0001	0.0001
			(0.566)	(0.443)
Color (%)	0.0002	0.0002		
	(0.950)	(0.842)		
Population Density (LN)	-0.0059*	-0.0065*	-0.0062*	-0.0066*
	(-2.013)	(-2.143)	(-2.067)	(-2.169)
Below Poverty (%)		-0.0003		-0.0002
		(-0.550)		(-0.365)
Owner Occupied Units (%)		-0.0003		-0.0003
		(-1.061)		(-1.010)
Constant	0.0724**	0.0963**	0.0750**	0.0968**
	(2.613)	(2.655)	(2.646)	(2.648)
Spatial Autoregressive Coefficient (Rho)	0.9908***	0.9908***	0.9905***	0.9906***
	(147.924)	(148.342)	(144.696)	(145.964)
Observations	362	362	362	362
R-squared	0.9461	0.9462	0.9461	0.9463
Log-likelihood Queen	345.7776	346.3394	345.9476	346.4763
Akaike Info Coefficient	-683.56	-680.68	-679.90	-676.95
Moran's I-Queen	0.2641***	0.2605***	0.2637***	0.2605***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

59. South Texas Project, Texas

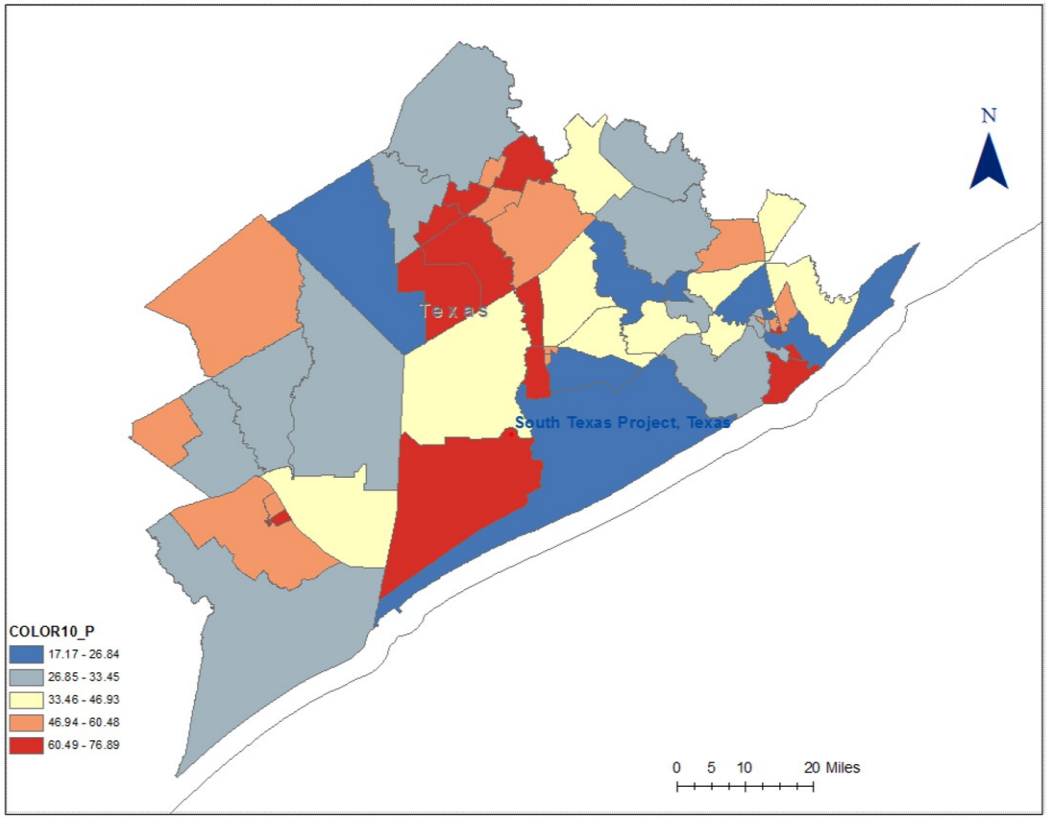

Figure C. 54 Spatial distribution of percent Color among the populations surrounding South Texas Project

Table C. 213
Descriptive Statistics for Study Variables at South Texas Project

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.457	0.425	2.289	3.912
Black (%)	10.083	9.652	0.000	48.528
Asian (%)	1.306	2.729	0.000	17.682
Hispanic (%)	31.478	16.132	0.000	66.850
Color (%)	43.967	18.375	0.000	76.894
Population Density (LN)	4.607	2.072	0.000	8.338
Below Poverty (%)	14.236	8.120	0.000	37.436
Owner Occupied Units (%)	57.982	17.676	0.000	87.093
Observations	60			

Table C. 214
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at South Texas Project

	rho	p	count
Black (%)	-0.1492	0.2551	60
Asian (%)	-0.0947	0.4716	60
Hispanic (%)	0.0374	0.7769	60
Color (%)	-0.0673	0.6095	60
Population Density (LN)	0.2044	0.1172	60
Below Poverty (%)	-0.2191	0.0926	60
Owner Occupied Units (%)	0.1123	0.3931	60

Table C. 215

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at South Texas Project

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0090	-0.0018
			(-1.531)	(-0.265)
Asian (%)			-0.0237	-0.0186
			(-1.147)	(-0.896)
Hispanic (%)			-0.0011	0.0040
			(-0.313)	(0.882)
Color (%)	-0.0038	0.0021		
	(-1.183)	(0.469)		
Population Density (LN)	0.0540+	0.0496+	0.0492+	0.0490+
	(1.915)	(1.726)	(1.753)	(1.716)
Below Poverty (%)		-0.0177+		-0.0178+
		(-1.805)		(-1.820)
Owner Occupied Units (%)		0.0005		-0.0000
		(0.173)		(-0.012)
Constant	3.3734***	3.3556***	3.3868***	3.4045***
	(20.848)	(14.667)	(20.835)	(14.617)
Observations	60	60	60	60
R-squared	0.065	0.120	0.092	0.147
F	1.9725	1.8705	1.3960	1.5166
Log-likelihood	-31.2952	-29.4766	-30.4019	-28.5494
Akaike Info Coefficient	68.5905	68.9532	70.8037	71.0989
Moran's I-Queen	0.6107***	0.5671***	0.6038***	0.5606***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 216

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at South Texas Project

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0037	-0.0018
			(-1.166)	(-0.466)
Asian (%)			-0.0173	-0.0154
			(-1.553)	(-1.365)
Hispanic (%)			-0.0001	0.0012
			(-0.054)	(0.500)
Color (%)	-0.0012	0.0004		
	(-0.693)	(0.153)		
Population Density (LN)	0.0061	0.0033	0.0047	0.0036
	(0.381)	(0.203)	(0.301)	(0.228)
Below Poverty (%)		-0.0047		-0.0046
		(-0.844)		(-0.858)
Owner Occupied Units (%)		0.0011		0.0007
		(0.598)		(0.378)
Constant	0.4959*	0.4722+	0.5136*	0.5134+
	(2.091)	(1.791)	(2.184)	(1.946)
Spatial Autoregressive Coefficient (Rho)	0.8699***	0.8615***	0.8693***	0.8603***
	(13.092)	(12.478)	(13.161)	(12.485)
Observations	60	60	60	60
R-squared	0.7009	0.7048	0.7132	0.7156
Log-likelihood Queen	-4.2724	-3.6566	-3.0040	-2.5065
Akaike Info Coefficient	16.54	19.31	18.01	21.01
Moran's I-Queen	0.0472	0.0378	0.0556	0.0446

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

60. Vermont Yankee Nuclear Power Plant, Vermont

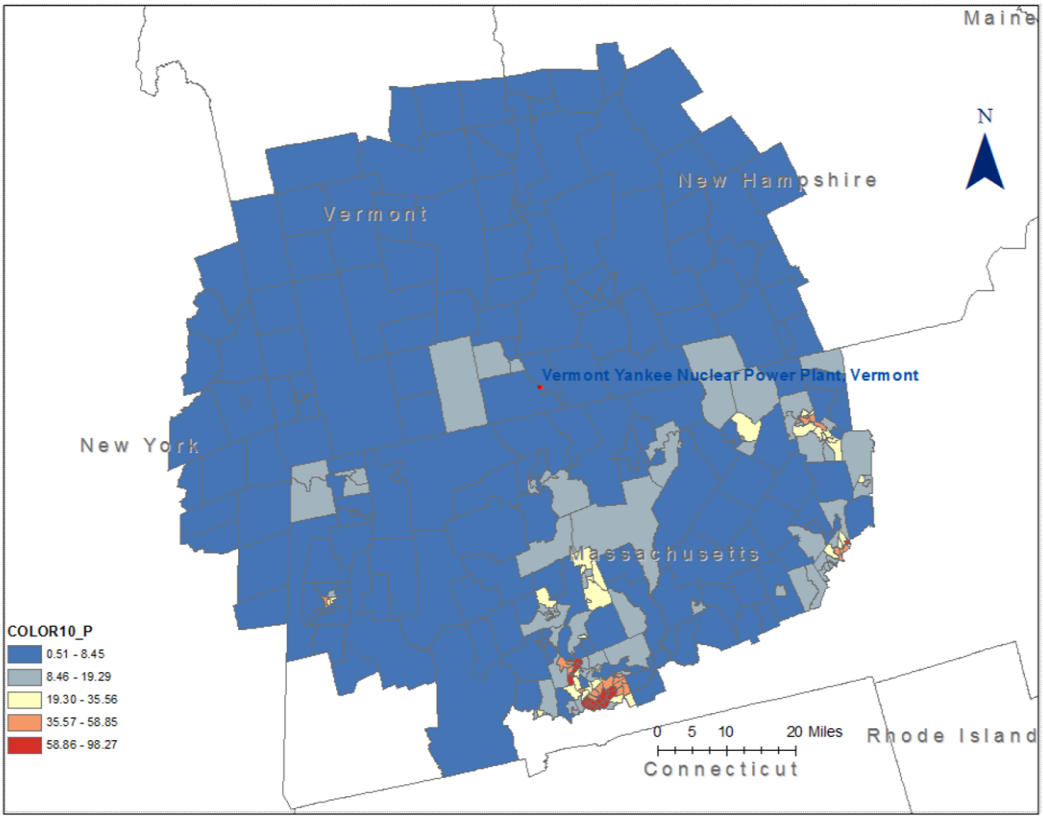

Figure C. 55 Spatial distribution of percent Color among the populations surrounding Vermont Yankee Nuclear Power Plant

Table C. 217

Descriptive Statistics for Study Variables at Vermont Yankee Nuclear Power Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.534	0.454	0.785	3.912
Black (%)	3.769	7.501	0.000	53.369
Asian (%)	1.646	2.434	0.000	16.388
Hispanic (%)	9.516	17.199	0.000	93.381
Color (%)	16.252	21.575	0.510	98.270
Population Density (LN)	6.199	1.824	2.244	9.577
Below Poverty (%)	12.960	12.112	0.000	76.019
Owner Occupied Units (%)	59.803	21.573	0.000	97.502
Observations	323			

Table C. 218

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Vermont Yankee Nuclear Power Plant

	rho	p	count
Black (%)	0.2468	0.0000	323
Asian (%)	0.0543	0.3307	323
Hispanic (%)	0.2601	0.0000	323
Color (%)	0.2865	0.0000	323
Population Density (LN)	0.3092	0.0000	323
Below Poverty (%)	0.0991	0.0752	323
Owner Occupied Units (%)	-0.0413	0.4594	323

Table C. 219

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Vermont Yankee Nuclear Power Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0062	0.0071+
			(1.644)	(1.902)
Asian (%)			-0.0061	-0.0006
			(-0.572)	(-0.054)
Hispanic (%)			0.0023	0.0091***
			(1.287)	(3.783)
Color (%)	0.0031*	0.0085***		
	(2.157)	(4.339)		
Population Density (LN)	0.0530**	0.0578***	0.0552**	0.0628***
	(3.081)	(3.423)	(3.102)	(3.599)
Below Poverty (%)		-0.0095*		-0.0107**
		(-2.566)		(-2.780)
Owner Occupied Units (%)		0.0024		0.0020
		(1.467)		(1.259)
Constant	3.1551***	3.0208***	3.1569***	3.0484***
	(32.834)	(18.428)	(32.376)	(18.474)
Observations	323	323	323	323
R-squared	0.109	0.157	0.115	0.164
F	19.4841	14.8403	10.3237	10.3410
Log-likelihood	-183.8903	-174.8077	-182.7307	-173.4959
Akaike Info Coefficient	373.7806	359.6154	375.4615	360.9918
Moran's I-Queen	0.8647***	0.846***	0.8633***	0.8428***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 220

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Vermont Yankee Nuclear Power Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0000	0.0001
			(-0.036)	(0.115)
Asian (%)			-0.0003	-0.0004
			(-0.113)	(-0.164)
Hispanic (%)			0.0001	0.0005
			(0.203)	(0.861)
Color (%)	0.0001	0.0004		
	(0.217)	(0.858)		
Population Density (LN)	-0.0004	-0.0008	-0.0001	-0.0002
	(-0.107)	(-0.212)	(-0.033)	(-0.052)
Below Poverty (%)		-0.0013		-0.0014
		(-1.501)		(-1.550)
Owner Occupied Units (%)		-0.0005		-0.0005
		(-1.244)		(-1.278)
Constant	0.0434	0.0855*	0.0426	0.0861*
	(1.430)	(1.998)	(1.390)	(1.994)
Spatial Autoregressive Coefficient (Rho)	0.9895***	0.9894***	0.9895***	0.9893***
	(145.341)	(143.048)	(145.220)	(142.305)
Observations	323	323	323	323
R-squared	0.9547	0.9551	0.9547	0.9551
Log-likelihood Queen	237.0384	238.2912	237.0478	238.3837
Akaike Info Coefficient	-466.08	-464.58	-462.28	-460.71
Moran's I-Queen	0.0339	0.0321	0.0337	0.0315

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

61. North Anna Power Station, Virginia

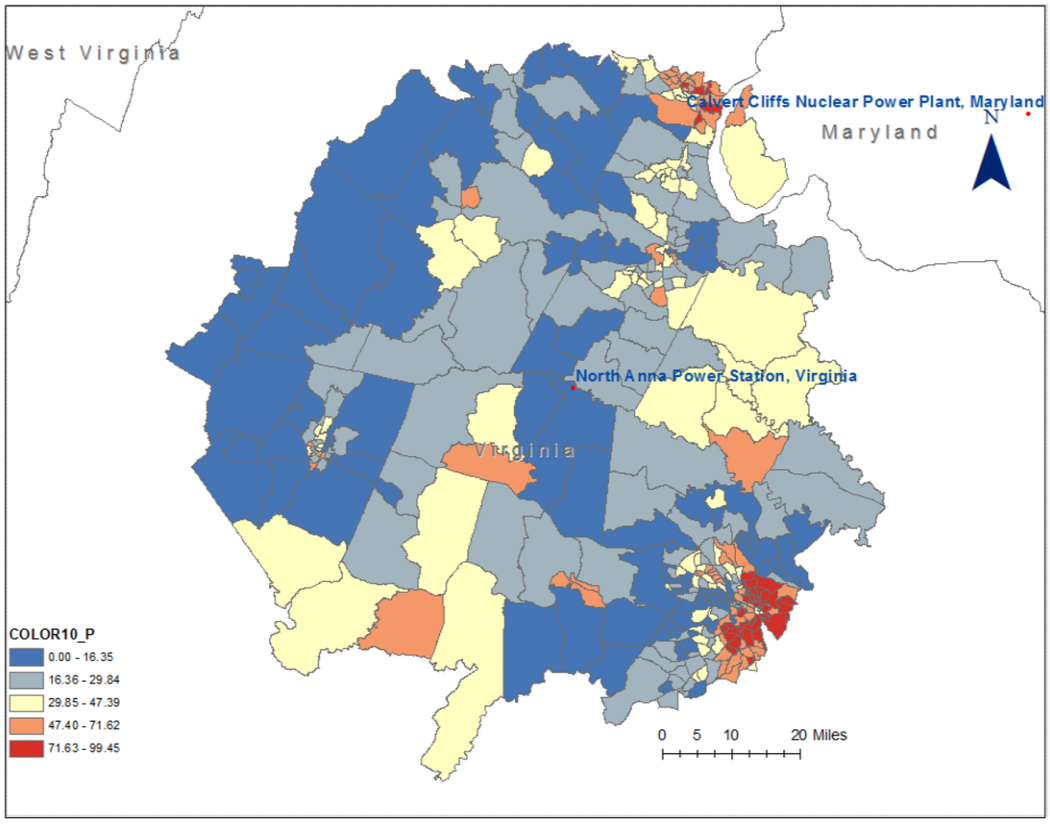

Figure C. 56 Spatial distribution of percent Color among the populations surrounding North Anna Power Station

Table C. 221
Descriptive Statistics for Study Variables at North Anna Power Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.548	0.347	1.484	3.908
Black (%)	24.272	23.479	0.000	97.574
Asian (%)	3.371	4.673	0.000	34.015
Hispanic (%)	6.484	7.493	0.000	45.826
Color (%)	36.234	25.334	0.000	99.454
Population Density (LN)	6.858	1.672	0.000	9.887
Below Poverty (%)	11.215	12.894	0.000	84.649
Owner Occupied Units (%)	63.426	22.779	0.000	98.060
Observations	394			

Table C. 222
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at North Anna Power Station

	rho	p	count
Black (%)	0.2118	0.0000	394
Asian (%)	0.1325	0.0085	394
Hispanic (%)	0.1701	0.0007	394
Color (%)	0.2774	0.0000	394
Population Density (LN)	0.3315	0.0000	394
Below Poverty (%)	0.0871	0.0843	394
Owner Occupied Units (%)	-0.1205	0.0168	394

Table C. 223

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at North Anna Power Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0020**	0.0027**
			(2.680)	(3.219)
Asian (%)			0.0039	0.0050
			(1.016)	(1.270)
Hispanic (%)			0.0042+	0.0039+
			(1.867)	(1.666)
Color (%)	0.0023**	0.0029***		
	(3.168)	(3.695)		
Population Density (LN)	0.0540***	0.0596***	0.0515***	0.0569***
	(4.987)	(5.328)	(4.500)	(4.827)
Below Poverty (%)		-0.0024		-0.0020
		(-1.364)		(-1.102)
Owner Occupied Units (%)		0.0005		0.0006
		(0.485)		(0.563)
Constant	3.0953***	3.0309***	3.1043***	3.0352***
	(44.664)	(25.994)	(44.082)	(25.984)
Observations	394	394	394	394
R-squared	0.132	0.142	0.134	0.142
F	29.7756	16.0368	15.0663	10.6512
Log-likelihood	-113.8315	-111.6894	-113.3843	-111.6500
Akaike Info Coefficient	233.6629	233.3788	236.7687	237.3001
Moran's I-Queen	0.8488***	0.8449***	0.8503***	0.8453***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 224

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at North Anna Power Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0001	0.0002
			(0.677)	(1.083)
Asian (%)			0.0001	0.0004
			(0.134)	(0.418)
Hispanic (%)			0.0002	0.0002
			(0.397)	(0.457)
Color (%)	0.0001	0.0002		
	(0.770)	(1.201)		
Population Density (LN)	-0.0025	-0.0017	-0.0025	-0.0019
	(-1.071)	(-0.712)	(-1.028)	(-0.735)
Below Poverty (%)		0.0000		0.0000
		(0.038)		(0.075)
Owner Occupied Units (%)		0.0002		0.0003
		(1.142)		(1.142)
Constant	0.0454*	0.0214	0.0456*	0.0219
	(2.261)	(0.757)	(2.249)	(0.772)
Spatial Autoregressive Coefficient (Rho)	0.9919***	0.9918***	0.9919***	0.9918***
	(223.765)	(221.827)	(223.546)	(221.851)
Observations	394	394	394	394
R-squared	0.9603	0.9605	0.9603	0.9605
Log-likelihood Queen	419.1299	420.0618	419.1398	420.0540
Akaike Info Coefficient	-830.26	-828.12	-826.28	-824.11
Moran's I-Queen	0.3436***	0.3436***	0.3435***	0.3419***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

62. Surry Nuclear Power Station, Virginia

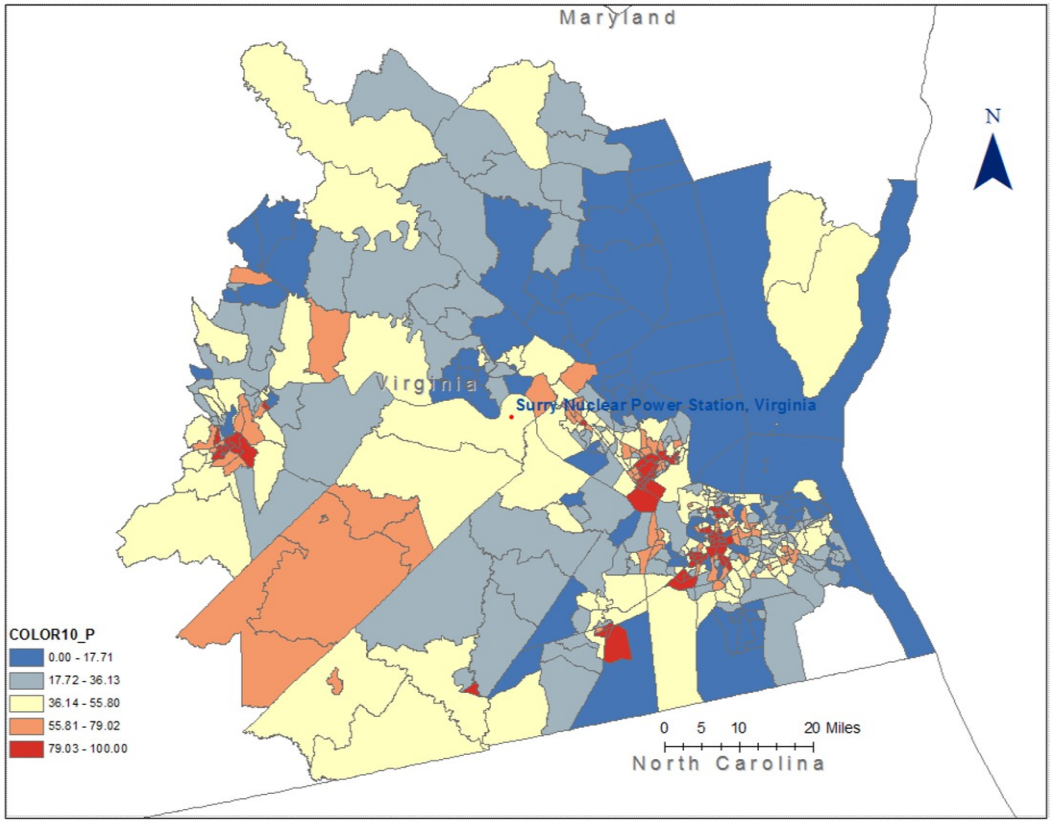

Figure C. 57 Spatial distribution of percent Color among the populations surrounding Surry Nuclear Power Station

Table C. 225
Descriptive Statistics for Study Variables at Surry Nuclear Power Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.314	0.470	1.552	3.911
Black (%)	33.527	27.278	0.000	99.585
Asian (%)	2.905	3.672	0.000	25.747
Hispanic (%)	4.392	4.304	0.000	24.670
Color (%)	42.841	26.866	0.000	100.000
Population Density (LN)	7.076	2.002	0.000	9.494
Below Poverty (%)	11.699	11.956	0.000	100.000
Owner Occupied Units (%)	56.116	25.092	0.000	95.266
Observations	501			

Table C. 226
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Surry Nuclear Power Station

	rho	p	count
Black (%)	-0.0050	0.9106	501
Asian (%)	0.0344	0.4424	501
Hispanic (%)	-0.1106	0.0132	501
Color (%)	-0.0197	0.6598	501
Population Density (LN)	0.0059	0.8960	501
Below Poverty (%)	0.0138	0.7571	501
Owner Occupied Units (%)	0.0303	0.4990	501

Table C. 227
Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Surry Nuclear Power Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0002	-0.0006
			(-0.252)	(-0.581)
Asian (%)			0.0091	0.0097
			(1.401)	(1.472)
Hispanic (%)			-0.0158**	-0.0161**
			(-2.976)	(-2.834)
Color (%)	-0.0005	-0.0008		
	(-0.538)	(-0.754)		
Population Density (LN)	0.0039	0.0018	0.0074	0.0069
	(0.336)	(0.155)	(0.604)	(0.542)
Below Poverty (%)		0.0024		0.0014
		(0.997)		(0.536)
Owner Occupied Units (%)		0.0008		-0.0001
		(0.831)		(-0.109)
Constant	3.3068***	3.2621***	3.3125***	3.3189***
	(42.744)	(34.701)	(43.032)	(34.767)
Observations	501	501	501	501
R-squared	0.001	0.003	0.019	0.020
F	0.1532	0.3879	2.3687	1.6419
Log-likelihood	-331.4345	-330.8062	-326.8484	-326.6422
Akaike Info Coefficient	668.8691	671.6124	663.6969	667.2844
Moran's I-Queen	0.9571***	0.9546***	0.9392***	0.9382***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 228 Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Surry Nuclear Power Station
Index_62 Lag

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0001	0.0002
			(0.915)	(1.440)
Asian (%)			-0.0000	-0.0001
			(-0.054)	(-0.196)
Hispanic (%)			-0.0008	-0.0008
			(-1.229)	(-1.229)
Color (%)	0.0001	0.0002		
	(1.000)	(1.367)		
Population Density (LN)	-0.0057***	-0.0058***	-0.0050***	-0.0048**
	(-4.308)	(-4.274)	(-3.543)	(-3.210)
Below Poverty (%)		-0.0002		-0.0004
		(-0.757)		(-1.246)
Owner Occupied Units (%)		0.0000		-0.0000
		(0.248)		(-0.241)
Constant	0.0442***	0.0427***	0.0443***	0.0457***
	(4.196)	(3.513)	(4.164)	(3.674)
Spatial Autoregressive Coefficient (Rho)	0.9981***	0.9982***	0.9981***	0.9981***
	(589.100)	(594.419)	(569.788)	(578.716)
Observations	501	501	501	501
R-squared	0.9866	0.9866	0.9867	0.9867
Log-likelihood Queen	658.6519	659.0976	659.7437	660.5545
Akaike Info Coefficient	-1309.85	-1306.75	-1307.98	-1305.63
Moran's I-Queen	0.1772***	0.1818***	0.1744***	0.18***

t statistics in parentheses
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

63. Columbia Generating Station, Washington

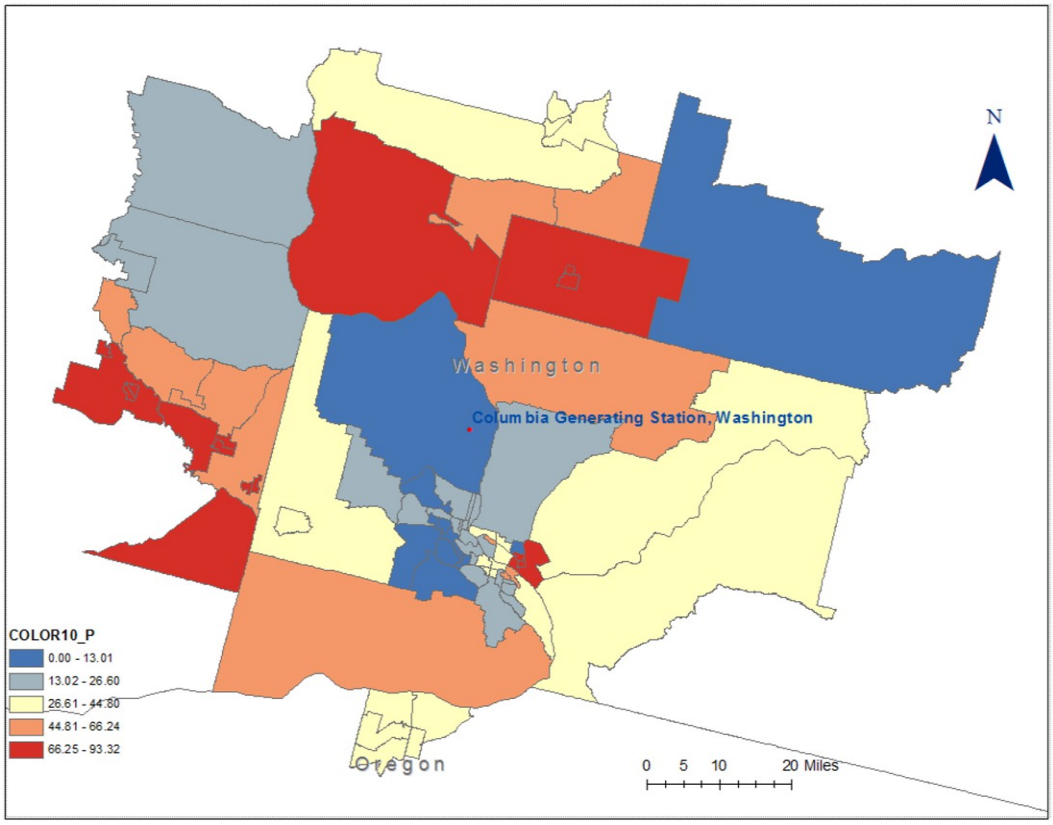

Figure C. 58 Spatial distribution of percent Color among the populations surrounding Columbia Generating Station

Table C. 229
Descriptive Statistics for Study Variables at Columbia Generating Station

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.201	0.464	2.264	3.905
Black (%)	1.211	1.727	0.000	9.682
Asian (%)	1.702	2.359	0.000	12.368
Hispanic (%)	34.140	26.632	0.000	85.381
Color (%)	39.842	26.211	0.000	93.321
Population Density (LN)	5.748	2.426	-2.349	8.883
Below Poverty (%)	17.131	11.576	0.000	48.426
Owner Occupied Units (%)	63.016	17.497	0.000	100.000
Observations	84			

Table C. 230
Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Columbia Generating Station

	rho	p	count
Black (%)	-0.0842	0.4461	84
Asian (%)	-0.4098	0.0001	84
Hispanic (%)	0.4476	0.0000	84
Color (%)	0.4513	0.0000	84
Population Density (LN)	-0.2070	0.0588	84
Below Poverty (%)	0.3644	0.0007	84
Owner Occupied Units (%)	-0.1586	0.1495	84

Table C. 231

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Columbia Generating Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0051	-0.0055
			(-0.200)	(-0.208)
Asian (%)			-0.0448*	-0.0497*
			(-2.171)	(-2.350)
Hispanic (%)			0.0069***	0.0045+
			(3.833)	(1.717)
Color (%)	0.0088***	0.0081**		
	(5.206)	(3.044)		
Population Density (LN)	-0.0545**	-0.0544**	-0.0368+	-0.0368+
	(-2.990)	(-2.948)	(-1.898)	(-1.889)
Below Poverty (%)		0.0024		0.0070
		(0.379)		(1.154)
Owner Occupied Units (%)		0.0005		0.0003
		(0.179)		(0.089)
Constant	3.1646***	3.1167***	3.2617***	3.2124***
	(25.699)	(11.824)	(26.488)	(11.973)
Observations	84	84	84	84
R-squared	0.283	0.284	0.311	0.324
F	15.9728	7.8399	8.9066	6.1422
Log-likelihood	-40.2419	-40.1647	-38.5715	-37.7787
Akaike Info Coefficient	86.4838	90.3293	87.1430	89.5574
Moran's I-Queen	0.7070***	0.7058***	0.6823***	0.6702***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 232

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Columbia Generating Station

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0030	-0.0000
			(0.334)	(-0.001)
Asian (%)			-0.0050	-0.0075
			(-0.692)	(-1.032)
Hispanic (%)			0.0005	-0.0004
			(0.818)	(-0.461)
Color (%)	0.0007	-0.0000		
	(1.163)	(-0.022)		
Population Density (LN)	-0.0116+	-0.0121+	-0.0103	-0.0101
	(-1.812)	(-1.929)	(-1.514)	(-1.535)
Below Poverty (%)		0.0009		0.0014
		(0.428)		(0.673)
Owner Occupied Units (%)		-0.0016		-0.0016
		(-1.579)		(-1.586)
Constant	0.2173*	0.3151**	0.2307*	0.3370**
	(2.138)	(2.619)	(2.169)	(2.657)
Spatial Autoregressive Coefficient (Rho)	0.9487***	0.9542***	0.9471***	0.9501***
	(31.910)	(33.965)	(31.127)	(32.258)
Observations	84	84	84	84
R-squared	0.9116	0.9160	0.9118	0.9165
Log-likelihood Queen	33.3575	35.1524	33.5601	35.6946
Akaike Info Coefficient	-58.72	-58.30	-55.12	-55.39
Moran's I-Queen	0.069	0.08	0.0541	0.0568

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

64. Kewaunee Power Station, Wisconsin and 65. Point Beach Nuclear Plant, Wisconsin

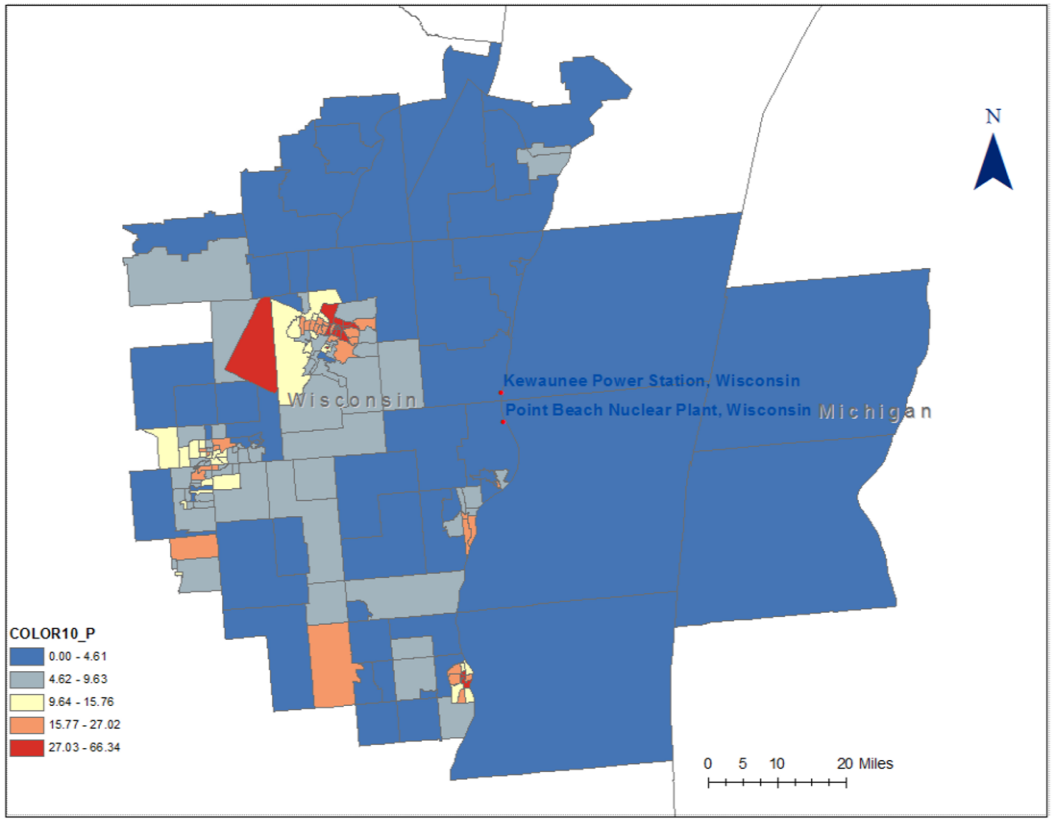

Figure C. 59 Spatial distribution of percent Color among the populations surrounding Kewaunee Power Station and Point Beach Nuclear Plant

Table C. 233

Descriptive Statistics for Study Variables at Kewaunee Power Station and Point Beach Nuclear Plant

	Mean	SD	Min	Max
Distance from Nuclear Power Plant (Natural Log)	3.433	0.417	1.329	3.912
Black (%)	1.565	4.118	0.000	46.749
Asian (%)	2.662	3.272	0.000	18.179
Hispanic (%)	4.539	6.969	0.000	41.382
Color (%)	11.389	11.688	0.000	66.337
Population Density (LN)	6.426	2.099	0.000	9.721
Below Poverty (%)	9.707	7.369	0.000	46.157
Owner Occupied Units (%)	63.605	20.944	0.000	96.544
Observations	189			

Table C. 234

Pearson Correlation Coefficients between Distance Mile (Natural Logarithm) and Independent Variables at Kewaunee Power Station and Point Beach Nuclear Plant

	rho	p	count
Black (%)	-0.0371	0.6123	189
Asian (%)	0.0714	0.3286	189
Hispanic (%)	-0.0703	0.3364	189
Color (%)	-0.0578	0.4294	189
Population Density (LN)	0.0297	0.6846	189
Below Poverty (%)	-0.0476	0.5157	189
Owner Occupied Units (%)	0.0028	0.9696	189

Table C. 235

Results from Ordinary Least Square (OLS) Regression Analysis for Distance Mile (Natural Logarithm) at Kewaunee Power Station and Point Beach Nuclear Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			-0.0027	-0.0046
			(-0.350)	(-0.555)
Asian (%)			0.0101	0.0093
			(0.973)	(0.881)
Hispanic (%)			-0.0059	-0.0055
			(-1.227)	(-1.024)
Color (%)	-0.0034	-0.0035		
	(-1.145)	(-0.979)		
Population Density (LN)	0.0154	0.0214	0.0078	0.0152
	(0.922)	(1.168)	(0.451)	(0.781)
Below Poverty (%)		-0.0033		-0.0037
		(-0.606)		(-0.687)
Owner Occupied Units (%)		-0.0012		-0.0012
		(-0.688)		(-0.680)
Constant	3.3733***	3.4410***	3.3873***	3.4553***
	(33.775)	(25.222)	(33.450)	(24.905)
Observations	189	189	189	189
R-squared	0.008	0.011	0.015	0.019
F	0.7384	0.5322	0.6901	0.5737
Log-likelihood	-101.5886	-101.2489	-100.9289	-100.5653
Akaike Info Coefficient	209.1771	212.4979	211.8577	215.1306
Moran's I-Queen	0.8570***	0.8596***	0.8545***	0.8500***

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table C. 236

Results from Spatial Regression Analysis for Distance Mile (Natural Logarithm) at Kewaunee Power Station and Point Beach Nuclear Plant

	Model 1	Model 2	Model 3	Model 4
Black (%)			0.0007	-0.0019
			(0.300)	(-0.783)
Asian (%)			0.0018	0.0004
			(0.572)	(0.133)
Hispanic (%)			0.0004	-0.0004
			(0.314)	(-0.256)
Color (%)	0.0005	-0.0004		
	(0.553)	(-0.426)		
Population Density (LN)	-0.0108*	-0.0054	-0.0115*	-0.0051
	(-2.179)	(-1.024)	(-2.254)	(-0.921)
Below Poverty (%)		-0.0011		-0.0013
		(-0.736)		(-0.873)
Owner Occupied Units (%)		-0.0014**		-0.0015**
		(-2.958)		(-3.011)
Constant	0.1714**	0.2423***	0.1749**	0.2481***
	(2.866)	(3.829)	(2.894)	(3.883)
Spatial Autoregressive Coefficient (Rho)	0.9707***	0.9729***	0.9704***	0.9727***
	(61.578)	(64.426)	(61.145)	(64.140)
Observations	189	189	189	189
R-squared	0.9118	0.9160	0.9119	0.9163
Log-likelihood Queen	97.1714	101.4399	97.3014	101.7279
Akaike Info Coefficient	-186.34	-190.88	-182.60	-187.46
Moran's I-Queen	0.1416***	0.1157***	0.1409***	0.1188*

t statistics in parentheses

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

APPENDIX D

PLUME PATH PROJECTION

LIST OF FIGURES

1. Summary Output: Plume Path Projection for Quarter 1

Case Summary

Event Type Nuclear Power Plant

Case description
None

Location

Name:	Palo Verde - Unit 1
City, county, state:	Wintersburg, Maricopa, AZ
Lat / Long / Elev:	33.3897° N, 112.8619° W, 290 m
Time zone:	Mountain
Population (2010):	288 / 3,391 / 7,277 (2 / 5 / 10 mi)

Reactor Parameters

Reactor power:	3990 MWt
Peak rod burn-up:	30000 MWd / MTU
Containment type:	PWR Dry Ambient
Containment volume:	2.60E+06 ft³
Design pressure:	60 lb/in²
Design leak rate:	0.10 %/d
Coolant mass:	2.79E+05 kg
Assemblies in core:	241
Steam generator type:	U-Tube
SG water mass:	42184 kg

Source Term

Type:	Long Term Station Blackout (SOARCA)
Shutdown:	2010/02/20 00:00
Release from core starts:	2010/02/20 12:00
Core damage estimated by:	Core recovered status
Core recovered:	No
Inventory:	Default

Release Pathway

Type:	PWR - Dry Containment Leakage or Failure
Description:	Palo Verde Unit 1 Plume Path Way on Q1
Release height:	10. m

Release events

2010/02/20 12:00	Leak rate (% vol) Design
2010/02/20 12:00	Sprays Off

Meteorology

Type:	Actual Observations
Dataset name:	PALO 2010-02-20 Q1
Dataset desc:	Obs/fcsts for Palo Verde - Unit 1

Summary of data at release point:	Type	Dir deg	Speed mph	Stab class	Precip	Temp °F

2010/02/20 10:00	Obs	292	6.2	D	?	---
2010/02/20 12:00	Obs	292	6.2	D	?	---
2010/02/20 14:00	Obs	292	6.2	D	?	---
2010/02/20 16:00	Obs	292	6.2	D	?	---
2010/02/20 18:00	Obs	292	6.2	D	?	---
2010/02/20 20:00	Obs	292	6.2	D	?	---
2010/02/20 22:00	Obs	292	6.2	D	?	---
2010/02/21 01:00	Obs	292	6.2	D	?	---
2010/02/21 10:00	Obs	292	6.2	D	?	---
2010/02/21 12:00	Obs	292	6.2	D	?	---

Dataset options: Est. missing stability using: Wind speed, time of day, etc.
Modify winds for topography: Yes

Calculations

Case title: Palo Verde Plume Path Q1
End of calculations: 2010/02/21 12:00
Start of release to atmosphere + 24 h
Distance of calculation: Close-in + to 100 miles
Close-in distances: 0.5, 1.0, 1.5, 2.0, 3.0, 5.0, 7.0, 10.0 miles
Analyst name: Dean Kyne
Inhalation dose factors: FGR 11 (ICRP 26)

Figure D. 1 Summary Output: Plume Path Projection for Quarter 1

2. Summary Output: Plume Path Projection for Quarter 2

Case Summary

Event Type Nuclear Power Plant

Case description
None

Location

Name:	Palo Verde - Unit 1
City, county, state:	Wintersburg, Maricopa, AZ
Lat / Long / Elev:	33.3897° N, 112.8619° W, 290 m
Time zone:	Mountain
Population (2010):	288 / 3,391 / 7,277 (2 / 5 / 10 mi)

Reactor Parameters

Reactor power:	3990 MWt
Peak rod burn-up:	30000 MWd / MTU
Containment type:	PWR Dry Ambient
Containment volume:	2.60E+06 ft³
Design pressure:	60 lb/in²
Design leak rate:	0.10 %/d
Coolant mass:	2.79E+05 kg
Assemblies in core:	241
Steam generator type:	U-Tube
SG water mass:	42184 kg

Source Term

Type:	Long Term Station Blackout (SOARCA)
Shutdown:	2010/05/20 00:00
Release from core starts:	2010/05/20 12:00
Core damage estimated by:	Core recovered status
Core recovered:	No
Inventory:	Default

Release Pathway

Type:	PWR - Dry Containment Leakage or Failure
Description:	Palo Verde Unit 1 Plume Path Way on Q2
Release height:	10. m

Release events

2010/05/20 12:00	Leak rate (% vol) Design
2010/05/20 12:00	Sprays Off

Meteorology

Type:	Actual Observations
Dataset name:	PALO 2010-02-20 Q2
Dataset desc:	Obs/fcsts for Palo Verde - Unit 1

Summary of data at release point:	Type	Dir deg	Speed mph	Stab class	Precip	Temp °F

2010/05/20 10:00	Obs	225	7.6	A	?	---
2010/05/20 12:00	Obs	225	7.6	A	?	---
2010/05/20 14:00	Obs	225	7.6	A	?	---
2010/05/20 16:00	Obs	225	7.6	A	?	---
2010/05/20 18:00	Obs	225	7.6	A	?	---
2010/05/20 20:00	Obs	225	7.6	A	?	---
2010/05/20 22:00	Obs	225	7.6	A	?	---
2010/05/21 01:00	Obs	225	7.6	A	?	---
2010/05/21 10:00	Obs	225	7.6	A	?	---
2010/05/21 12:00	Obs	225	7.6	A	?	---

Dataset options: Est. missing stability using: Wind speed, time of day, etc.
Modify winds for topography: Yes

Calculations

Case title: Palo Verde Plume Path Q2
End of calculations: 2010/05/21 12:00
Start of release to atmosphere + 24 h
Distance of calculation: Close-in + to 100 miles
Close-in distances: 0.5, 1.0, 1.5, 2.0, 3.0, 5.0, 7.0, 10.0 miles
Analyst name: Dean Kyne
Inhalation dose factors: FGR 11 (ICRP 26)

Figure D. 2 Summary Output: Plume Path Projection for Quarter 2

3. Summary Output: Plume Path Projection for Quarter 3

Case Summary

Event Type Nuclear Power Plant

Case description
None

Location

Name:	Palo Verde - Unit 1
City, county, state:	Wintersburg, Maricopa, AZ
Lat / Long / Elev:	33.3897° N, 112.8619° W, 290 m
Time zone:	Mountain
Population (2010):	288 / 3,391 / 7,277 (2 / 5 / 10 mi)

Reactor Parameters

Reactor power:	3990 MWt
Peak rod burn-up:	30000 MWd / MTU
Containment type:	PWR Dry Ambient
Containment volume:	2.60E+06 ft³
Design pressure:	60 lb/in²
Design leak rate:	0.10 %/d
Coolant mass:	2.79E+05 kg
Assemblies in core:	241
Steam generator type:	U-Tube
SG water mass:	42184 kg

Source Term

Type:	Long Term Station Blackout (SOARCA)
Shutdown:	2010/07/20 00:00
Release from core starts:	2010/07/20 12:00
Core damage estimated by:	Core recovered status
Core recovered:	No
Inventory:	Default

Release Pathway

Type:	PWR - Dry Containment Leakage or Failure
Description:	Palo Verde Unit 1 Plume Path Way on Q3
Release height:	10. m

Release events

2010/07/20 12:00	Leak rate (% vol) Design
2010/07/20 12:00	Sprays Off

Meteorology

Type:	Actual Observations
Dataset name:	PALO 2010-07-20 Q3
Dataset desc:	Obs/fcsts for Palo Verde - Unit 1

Summary of data at release point:

Type	Dir deg	Speed mph	Stab class	Precip	Temp °F

2010/07/20 10:00	Obs	248	7.3	E	?	---
2010/07/20 12:00	Obs	248	7.3	E	?	---
2010/07/20 14:00	Obs	248	7.3	E	?	---
2010/07/20 16:00	Obs	248	7.3	E	?	---
2010/07/20 18:00	Obs	248	7.3	E	?	---
2010/07/20 20:00	Obs	248	7.3	E	?	---
2010/07/20 22:00	Obs	248	7.3	E	?	---
2010/07/21 01:00	Obs	248	7.3	E	?	---
2010/07/21 10:00	Obs	248	7.3	E	?	---
2010/07/21 12:00	Obs	248	7.3	E	?	---

Dataset options: Est. missing stability using: Wind speed, time of day, etc.
Modify winds for topography: Yes

Calculations

Case title: Palo Verde Plume Path Q3
End of calculations: 2010/07/21 12:00
Start of release to atmosphere + 24 h
Distance of calculation: Close-in + to 100 miles
Close-in distances: 0.5, 1.0, 1.5, 2.0, 3.0, 5.0, 7.0, 10.0 miles
Analyst name: Dean Kyne
Inhalation dose factors: FGR 11 (ICRP 26)

Figure D. 3 Summary Output: Plume Path Projection for Quarter 3

4. Summary Output: Plume Path Projection for Quarter 4

Case Summary

Event Type Nuclear Power Plant

Case description
None

Location

Name:	Palo Verde - Unit 1
City, county, state:	Wintersburg, Maricopa, AZ
Lat / Long / Elev:	33.3897° N, 112.8619° W, 290 m
Time zone:	Mountain
Population (2010):	288 / 3,391 / 7,277 (2 / 5 / 10 mi)

Reactor Parameters

Reactor power:	3990 MWt
Peak rod burn-up:	30000 MWd / MTU
Containment type:	PWR Dry Ambient
Containment volume:	2.60E+06 ft³
Design pressure:	60 lb/in²
Design leak rate:	0.10 %/d
Coolant mass:	2.79E+05 kg
Assemblies in core:	241
Steam generator type:	U-Tube
SG water mass:	42184 kg

Source Term

Type:	Long Term Station Blackout (SOARCA)
Shutdown:	2010/11/20 00:00
Release from core starts:	2010/11/20 12:00
Core damage estimated by:	Core recovered status
Core recovered:	No
Inventory:	Default

Release Pathway

Type:	PWR - Dry Containment Leakage or Failure
Description:	Palo Verde Unit 1 Plume Path Way on Q4
Release height:	10. m

Release events

2010/11/20 12:00	Leak rate (% vol) Design
2010/11/20 12:00	Sprays Off

Meteorology

Type:	Actual Observations
Dataset name:	PALO 2010-11-20 Q4
Dataset desc:	Obs/fcsts for Palo Verde - Unit 1

Summary of data at release point:	Type	Dir deg	Speed mph	Stab class	Precip	Temp °F

2010/11/20 10:00	Obs	270	5.6	D	?	---
2010/11/20 12:00	Obs	270	5.6	D	?	---
2010/11/20 14:00	Obs	270	5.6	D	?	---
2010/11/20 16:00	Obs	270	5.6	D	?	---
2010/11/20 18:00	Obs	270	5.6	D	?	---
2010/11/20 20:00	Obs	270	5.6	D	?	---
2010/11/20 22:00	Obs	270	5.6	D	?	---
2010/11/21 01:00	Obs	270	5.6	D	?	---
2010/11/21 10:00	Obs	270	5.6	D	?	---
2010/11/21 12:00	Obs	270	5.6	D	?	---

Dataset options: Est. missing stability using: Wind speed, time of day, etc.
Modify winds for topography: Yes

Calculations

Case title: Palo Verde Plume Path Q4
End of calculations: 2010/11/21 12:00
Start of release to atmosphere + 24 h
Distance of calculation: Close-in + to 100 miles
Close-in distances: 0.5, 1.0, 1.5, 2.0, 3.0, 5.0, 7.0, 10.0 miles
Analyst name: Dean Kyne
Inhalation dose factors: FGR 11 (ICRP 26)

Figure D. 4 Summary Output: Plume Path Projection for Quarter 4

APPENDIX E

NUCLEAR POWER PLANT RISK COMPUTATION

LIST OF TABLES

1. Near-misses Events at NPPs between 2010 and 2012

Table E. 1 *Near-misses events at NPPs between 2010 and 2012*

Index	State	Plant	SIT (2010)	AIT (2010)	Total near-misses (2010)	SIT (2011)	AIT (2011)	Total near-misses (2011)	SIT (2012)	AIT (2012)	Total near-misses (2012)
1	Alabama	Browns Ferry Nuclear Plant									
2	Alabama	Joseph M. Farley Nuclear Plant	1		1				1		1
3	Arizona	Palo Verde Nuclear Generating Station							1		1
4	Arkansas	Arkansas Nuclear One	1		1						
5	California	Diablo Canyon Nuclear Power Plant	1		1						
6	California	San Onofre Nuclear Generating Station								1	1
7	Connecticut	Millstone Power Station				1		1			
8	Florida	Crystal River Nuclear Generating Plant	1		1						
9	Florida	St. Lucie Plant									
10	Florida	Turkey Point Nuclear Generating			1	1		1			
11	Georgia	Edwin I. Hatch Nuclear Plant									
12	Georgia	Vogtle Electric Generating Plant									
13	Illinois	Braidwood Station	1		1	1		1			
14	Illinois	Byron Station				1		1	1		1
15	Illinois	Clinton Power Station									
16	Illinois	Dresden Nuclear Power Station									
17	Illinois	LaSalle County Station									
18	Illinois	Quad Cities Nuclear Power Station									
19	Iowa	Duane Arnold Energy Center			1						
20	Kansas	Wolf Creek Generating Station	1		1	1		1	1	1	2
21	Louisiana	River Bend Station								1	1
22	Louisiana	Waterford Steam Electric Station									
23	Maryland	Calvert Cliffs Nuclear Power Plant	1		1						
24	Massachusetts	Pilgrim Nuclear Power Station				2		2			
25	Michigan	Donald C. Cook Nuclear Power Plant									
26	Michigan	Fermi									
27	Michigan	Palisades Nuclear Plant			1	2		2	1		1
28	Minnesota	Monticello Nuclear Generating Plant				1		1			
29	Minnesota	Prairie Island Nuclear Generating Plant									
30	Mississippi	Grand Gulf Nuclear Station									
31	Missouri	Callaway Plant				1		1			
32	Nebraska	Cooper Nuclear Station				1		1			
33	Nebraska	Fort Calhoun Station	1		1				2		2
34	New Hampshire	Seabrook Station									
35	New Jersey	Hope Creek Generating Station									
36	New Jersey	Oyster Creek Nuclear Generating Station									
37	New Jersey	Salem Nuclear Generating Station									
38	New York	James A. FitzPatrick Nuclear Power Plant									
39	New York	R.E. Ginna Nuclear Power Plant									
40	New York	Indian Point Nuclear Generating									
41	New York	Nine Mile Point Nuclear Station									
42	North Carolina	Brunswick Steam Electric Plant	1		1				1		1
43	North Carolina	McGuire Nuclear Station									
44	North Carolina	Shearon Harris Nuclear Power Plant							1		1
45	Ohio	Davis-Besse Nuclear Power Station	1		1						
46	Ohio	Perry Nuclear Power Plant				1		1	1		1
47	Pennsylvania	Beaver Valley Power Station									
48	Pennsylvania	Limerick Generating Station									
49	Pennsylvania	Peach Bottom Atomic Power Station									
50	Pennsylvania	Susquehanna Steam Electric Station									
51	Pennsylvania	Three Mile Island Nuclear Station									
52	South Carolina	Catawba Nuclear Station	1						1		1
53	South Carolina	Oconee Nuclear Station				1		1			
54	South Carolina	H. B. Robinson Steam Electric Plant	1	1	2						
55	South Carolina	Virgil C. Summer Nuclear Station									
56	Tennessee	Sequoyah Nuclear Plant									
57	Tennessee	Watts Bar Nuclear Plant									
58	Texas	Comanche Peak Steam Electric Station									
59	Texas	South Texas Project									
60	Vermont	Vermont Yankee Nuclear Power Plant									
61	Virginia	North Anna Power Station					1	1			
62	Virginia	Surry Nuclear Power Station	1		1						
63	Washington	Columbia Generating Station									
64	Wisconsin	Kewaunee Power Station									
65	Wisconsin	Point Beach Nuclear Plant									
		Total	13	1	14	14	1	15	11	3	14

2. Disaster and Location Risks of NPPs

Table E. 2 *Disaster and Location Risks of NPPs in US*

Index	State	Plant	Distance from City (mile)	Likelihood of Earthquake (0-6 scale)	Expected Number of Hurricanes in the Next Century	Significant Average Numbers of Tornadoes (1921-1995)
1	Alabama	Browns Ferry Nuclear Plant	32	2	0	25
2	Alabama	Joseph M. Farley Nuclear Plant	18	1	50	20
3	Arizona	Palo Verde Nuclear Generating Station	50	1	0	2.5
4	Arkansas	Arkansas Nuclear One	6	2	0	30
5	California	Diablo Canyon Nuclear Power Plant	12	5	0	2.5
6	California	San Onofre Nuclear Generating Station	45	4	0	2.5
7	Connecticut	Millstone Power Station	3.2	1	30	2.5
8	Florida	Crystal River Nuclear Generating Plant	80	0	50	7.5
9	Florida	St. Lucie Plant	10	0	60	2.5
10	Florida	Turkey Point Nuclear Generating	20	0	60	2.5
11	Georgia	Edwin I. Hatch Nuclear Plant	20	2	50	10.5
12	Georgia	Vogtle Electric Generating Plant	26	2	50	12.5
13	Illinois	Braidwood Station	20	1	0	17.5
14	Illinois	Byron Station	17	1	0	17.5
15	Illinois	Clinton Power Station	23	2	0	20
16	Illinois	Dresden Nuclear Power Station	25	2	0	20
17	Illinois	LaSalle County Station	11	1	0	17.5
18	Illinois	Quad Cities Nuclear Power Station	20	1	0	20
19	Iowa	Duane Arnold Energy Center	8	0	0	25
20	Kansas	Wolf Creek Generating Station	3.5	1	0	27.5
21	Louisiana	River Bend Station	24	1	30	20
22	Louisiana	Waterford Steam Electric Station	25	1	50	15
23	Maryland	Calvert Cliffs Nuclear Power Plant	40	1	30	7.5
24	Massachusetts	Pilgrim Nuclear Power Station	38	2	30	2.5
25	Michigan	Donald C. Cook Nuclear Power Plant	13	1	0	12.5
26	Michigan	Fermi	25	1	0	12.5
27	Michigan	Palisades Nuclear Plant	5	0	0	12.5
28	Minnesota	Monticello Nuclear Generating Plant	30	0	0	15
29	Minnesota	Prairie Island Nuclear Generating Plant	28	0	0	15
30	Mississippi	Grand Gulf Nuclear Station	20	1	30	32.5
31	Missouri	Callaway Plant	25	2	0	17.5
32	Nebraska	Cooper Nuclear Station	23	0	0	27.5
33	Nebraska	Fort Calhoun Station	19	1	0	22.5
34	New Hampshire	Seabrook Station	13	2	30	2.5
35	New Jersey	Hope Creek Generating Station	18	2	30	2.5
36	New Jersey	Oyster Creek Nuclear Generating Station	9	2	30	5
37	New Jersey	Salem Nuclear Generating Station	18	2	30	2.5
38	New York	James A. FitzPatrick Nuclear Power Plant	6	1	0	2.5
39	New York	R.E. Ginna Nuclear Power Plant	20	1	0	2.5
40	New York	Indian Point Nuclear Generating	24	2	30	2.5
41	New York	Nine Mile Point Nuclear Station	6	1	0	2.5
42	North Carolina	Brunswick Steam Electric Plant	40	2	60	7.5
43	North Carolina	McGuire Nuclear Station	17	2	30	10
44	North Carolina	Shearon Harris Nuclear Power Plant	20	2	30	10
45	Ohio	Davis-Besse Nuclear Power Station	21	1	0	12.5
46	Ohio	Perry Nuclear Power Plant	35	2	0	7.5
47	Pennsylvania	Beaver Valley Power Station	17	1	0	7.5
48	Pennsylvania	Limerick Generating Station	21	2	30	7.5
49	Pennsylvania	Peach Bottom Atomic Power Station	17.9	2	30	7.5
50	Pennsylvania	Susquehanna Steam Electric Station	70	1	30	7.5
51	Pennsylvania	Three Mile Island Nuclear Station	10	1	30	7.5
52	South Carolina	Catawba Nuclear Station	18	2	30	12.5
53	South Carolina	Oconee Nuclear Station	30	2	30	12.5
54	South Carolina	H. B. Robinson Steam Electric Plant	26	2	30	12.5
55	South Carolina	Virgil C. Summer Nuclear Station	26	3	30	12.5
56	Tennessee	Sequoyah Nuclear Plant	16	3	0	20
57	Tennessee	Watts Bar Nuclear Plant	60	3	0	15
58	Texas	Comanche Peak Steam Electric Station	40	0	30	27.5
59	Texas	South Texas Project	90	0	50	15
60	Vermont	Vermont Yankee Nuclear Power Plant	5	2	30	2.5
61	Virginia	North Anna Power Station	40	2	30	7.5
62	Virginia	Surry Nuclear Power Station	17	1	50	7.5
63	Washington	Columbia Generating Station	20	3	0	2.5
64	Wisconsin	Kewaunee Power Station	27	0	0	10
65	Wisconsin	Point Beach Nuclear Plant	13	0	0	10

3. Radioactive Effluents Released from NPPs and their Radiation (2001-2008)

Table E. 3 *Radioactive Effluents Released from NPPs and their Radiation between 2001 and 2008*

Index	State	Plant	Total (Ci/GW a)	CED (man mSV/GW a)
1	Alabama	Browns Ferry Nuclear Plant	4.31E+03	5.71E+02
2	Alabama	Joseph M. Farley Nuclear Plant	1.42E+04	3.75E+02
3	Arizona	Palo Verde Nuclear Generating Station	1.30E+04	9.41E+02
4	Arkansas	Arkansas Nuclear One	1.22E+04	4.60E+02
5	California	Diablo Canyon Nuclear Power Plant	2.55E+04	7.32E+02
6	California	San Onofre Nuclear Generating Station	1.51E+04	8.80E+02
7	Connecticut	Millstone Power Station	2.25E+04	8.91E+04
8	Florida	Crystal River Nuclear Generating Plant	1.03E+04	3.98E+03
9	Florida	St. Lucie Plant	7.08E+03	2.94E+02
10	Florida	Turkey Point Nuclear Generating	8.87E+03	2.31E+02
11	Georgia	Edwin I. Hatch Nuclear Plant	1.23E+03	5.85E+01
12	Georgia	Vogtle Electric Generating Plant	1.85E+04	4.10E+02
13	Illinois	Braidwood Station	1.83E+04	5.27E+02
14	Illinois	Byron Station	2.56E+04	6.54E+02
15	Illinois	Clinton Power Station	2.83E+02	6.08E+01
16	Illinois	Dresden Nuclear Power Station	3.09E+03	4.92E+02
17	Illinois	LaSalle County Station	4.62E+04	5.06E+02
18	Illinois	Quad Cities Nuclear Power Station	4.31E+03	2.97E+02
19	Iowa	Duane Arnold Energy Center	1.51E+03	6.22E+01
20	Kansas	Wolf Creek Generating Station	1.74E+04	4.85E+02
21	Louisiana	River Bend Station	1.29E+04	1.21E+02
22	Louisiana	Waterford Steam Electric Station	2.18E+04	5.78E+02
23	Maryland	Calvert Cliffs Nuclear Power Plant	1.79E+04	4.57E+02
24	Massachusetts	Pilgrim Nuclear Power Station	1.10E+04	2.75E+02
25	Michigan	Donald C. Cook Nuclear Power Plant	1.91E+04	5.74E+02
26	Michigan	Fermi	8.47E+02	1.94E+02
27	Michigan	Palisades Nuclear Plant	1.52E+04	4.15E+02
28	Minnesota	Monticello Nuclear Generating Plant	3.15E+04	2.19E+02
29	Minnesota	Prairie Island Nuclear Generating Plant	9.26E+03	3.15E+02
30	Mississippi	Grand Gulf Nuclear Station	1.41E+04	5.42E+01
31	Missouri	Callaway Plant	3.11E+04	1.10E+03
32	Nebraska	Cooper Nuclear Station	3.88E+03	9.85E+01
33	Nebraska	Fort Calhoun Station	1.80E+04	3.22E+02
34	New Hampshire	Seabrook Station	1.33E+04	4.24E+02
35	New Jersey	Hope Creek Generating Station	1.31E+03	2.71E+01
36	New Jersey	Oyster Creek Nuclear Generating Station	3.32E+03	7.10E+03
37	New Jersey	Salem Nuclear Generating Station	1.24E+04	4.27E+02
38	New York	James A. FitzPatrick Nuclear Power Plant	1.30E+04	3.69E+02
39	New York	R.E. Ginna Nuclear Power Plant	1.29E+04	4.45E+02
40	New York	Indian Point Nuclear Generating	5.08E+03	1.49E+02
41	New York	Nine Mile Point Nuclear Station	1.08E+04	3.26E+02
42	North Carolina	Brunswick Steam Electric Plant	2.74E+04	5.72E+01
43	North Carolina	McGuire Nuclear Station	1.65E+04	5.27E+02
44	North Carolina	Shearon Harris Nuclear Power Plant	1.23E+04	5.20E+02
45	Ohio	Davis-Besse Nuclear Power Station	1.48E+04	1.18E+03
46	Ohio	Perry Nuclear Power Plant	1.25E+03	2.06E+02
47	Pennsylvania	Beaver Valley Power Station	1.49E+04	4.44E+02
48	Pennsylvania	Limerick Generating Station	2.77E+03	2.75E+01
49	Pennsylvania	Peach Bottom Atomic Power Station	9.83E+03	4.54E+01
50	Pennsylvania	Susquehanna Steam Electric Station	9.64E+02	3.07E+01
51	Pennsylvania	Three Mile Island Nuclear Station	8.52E+03	3.05E+02
52	South Carolina	Catawba Nuclear Station	1.06E+04	3.72E+02
53	South Carolina	Oconee Nuclear Station	1.40E+04	1.25E+03
54	South Carolina	H. B. Robinson Steam Electric Plant	6.90E+03	1.93E+02
55	South Carolina	Virgil C. Summer Nuclear Station	1.48E+04	4.43E+02
56	Tennessee	Sequoyah Nuclear Plant	1.65E+04	5.04E+02
57	Tennessee	Watts Bar Nuclear Plant	3.49E+04	1.20E+03
58	Texas	Comanche Peak Steam Electric Station	2.42E+04	7.19E+02
59	Texas	South Texas Project	2.01E+04	7.19E+02
60	Vermont	Vermont Yankee Nuclear Power Plant	6.70E+03	2.30E+03
61	Virginia	North Anna Power Station	1.28E+04	3.66E+02
62	Virginia	Surry Nuclear Power Station	9.66E+03	2.66E+02
63	Washington	Columbia Generating Station	2.84E+03	4.84E+01
64	Wisconsin	Kewaunee Power Station	7.70E+03	2.35E+02
65	Wisconsin	Point Beach Nuclear Plant	9.55E+03	3.45E+02
		Total	8.49E+05	1.27E+05

Table E. 4 *Demographic Characteristics of Populations Living within a 50-mile Radius of a NPP, Classified according to Four PRI Categories using 2000 U.S. Census Data*

2000	Low risk	Moderate risk	High risk	Very high risk	Total	Outside
Tract	8,445	5,659	4,966	4,325	23,395	49,662
Tract area (sq. mile)	71,490	70,709	74,961	83,640	300,801	3,495,942
Total population	31,403,768	22,749,056	19,864,116	16,579,092	90,596,032	190,825,872
White	21,737,780	18,061,564	14,291,062	11,727,800	65,818,204	145,535,520
Black	5,304,694	2,591,525	2,796,194	3,740,830	14,433,243	19,928,496
Asian	1,507,373	705,194	958,553	277,616	3,448,736	7,101,866
Native American	116,143	75,299	101,858	62,826	356,126	2,091,863
Others	2,737,679	1,315,441	1,716,471	770,054	6,539,645	16,168,205
Hispanic	3,917,209	1,883,578	2,410,601	2,151,733	10,363,121	24,875,360
Color	11,286,824	5,538,193	6,598,000	6,408,414	29,831,432	57,076,336
White (%)	69.22	79.39	71.94	70.74	72.65	76.27
Black (%)	16.89	11.39	14.08	22.56	15.93	10.44
Asian (%)	4.80	3.10	4.83	1.67	3.81	3.72
Native American (%)	0.37	0.33	0.51	0.38	0.39	1.1
Others (%)	8.72	5.78	8.64	4.64	7.22	8.47
Hispanic (%)	12.47	8.28	12.14	12.98	11.44	13.04
Color (%)	35.94	24.34	33.22	38.65	32.93	29.91
Renter housing units (%)	38.86	27.89	30.51	29.83	32.61	29.92
College degree or higher (%)	27.07	26.76	26.51	22.33	26	23.63
Unemployment (%)	6.39	5.28	5.06	6.12	5.76	5.78
Poverty (%)	12.97	9.59	10.23	13.64	11.64	12.73
Mean household income ($)	77,803	77,174	76,272	65,738	75,095	68,422

Table E. 5 *Demographic Characteristics of Populations Living within a 50-mile Radius of a NPP, Classified according to Four PRI Categories using 1990 U.S. Census Data*

1990	Low risk	Moderate risk	High risk	Very high risk	Total	Outside
Tract	8,445	5,659	4,966	4,325	23,395	49,662
Tract area (sq. mile)	71,490	70,709	74,961	83,640	300,801	3,495,942
Total population	29,488,630	20,729,628	16,962,878	14,893,501	82,074,640	166,634,720
White	22,231,036	17,488,574	13,402,362	11,141,399	64,263,368	135,563,232
Black	4,975,125	2,261,787	2,307,198	3,231,585	12,775,695	17,154,732
Asian	948,034	413,107	590,342	191,630	2,143,113	5,083,769
Native American	90,887	62,632	76,605	48,097	278,221	1,736,823
Others	1,243,513	503,449	586,381	280,815	2,614,158	7,095,939
Hispanic	2,763,748	982,149	1,337,453	1,417,928	6,501,278	15,398,823
Color	8,493,103	3,684,566	4,288,068	4,835,624	21,301,360	38,983,632
White (%)	75.39	84.37	79.01	74.81	78.3	81.35
Black (%)	16.87	10.91	13.60	21.70	15.57	10.29
Asian (%)	3.21	1.99	3.48	1.29	2.61	3.05
Native American (%)	0.31	0.30	0.45	0.32	0.34	1.04
Others (%)	4.22	2.43	3.46	1.89	3.19	4.26
Hispanic (%)	9.37	4.74	7.88	9.52	7.92	9.24
Color (%)	28.80	17.77	25.28	32.47	25.95	23.39
Renter housing units (%)	39.96	29.20	31.95	31.96	34.12	31.26
College degree or higher (%)	22.39	22.20	22.10	18.52	21.59	19.71
Unemployment (%)	7.00	5.86	5.15	6.32	6.19	6.37
Poverty (%)	12.84	9.58	9.88	14.31	11.67	13.83
Mean household income ($)	71,211	69,624	69,875	60,204	68,549	60,443